

GUIDE
TO THE
SPECIMENS
OF THE
HORSE FAMILY
(Equidæ)

EXHIBITED IN
THE DEPARTMENT OF ZOOLOGY,
BRITISH MUSEUM (NATURAL HISTORY),
CROMWELL ROAD, LONDON, S.W.

ILLUSTRATED BY 26 FIGURES.

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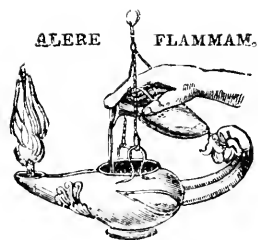
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P R E F A C E

Owing to the great interest attaching to the Horse and its relatives (alike from the point of view of the naturalist, the breeder, and the sportsman) it has been decided to issue a special Guide-Book to the specimens of this group exhibited in the public Galleries of the Zoological Department of the Museum.

It is hoped that the following pages will not only tend to stimulate this interest, but that they will also lead to the presentation of "record" specimens for preservation in the National Collection. In the case of skeletons of celebrated thoroughbreds, Arabs, and other breeds, their true interest can only be fully appreciated when they are brought together in a large series. It is only in a great public museum that the proper care and preservation of such specimens can be assured.

The present Guide-Book is the work of Mr. R. Lydekker.

E. RAY LANKESTER,
Director.

BRITISH MUSEUM (NATURAL HISTORY).
October, 1907.

GUIDE

TO

THE HORSE FAMILY.

The name "Horse." ALTHOUGH frequently employed in zoology in a wide sense, to indicate all the members of the family *Equidæ*, both living and extinct, the term "Horse" properly denotes only the well-known domesticated animal *Equus caballus* and its half-wild or wild representatives. Since, moreover, the Latin name was given by the Swedish naturalist Linnæus, it seems necessary to regard the domesticated Horses of Scandinavia as the typical representatives of the species.

In these pages the term Horse is mainly used in the more restricted sense.

Different views are entertained with regard to the limitations of the family *Equidæ*, some naturalists including in it all the extinct animals belonging to the same line of descent, or "phylum," while others restrict it to those more or less nearly related to the living species.

The Horse Family. In the latter sense the *Equidæ* are characterized by the tall prismatic crowns and complex structure of their cheek-teeth, in which all the hollows and valleys formed by the infoldings of enamel are filled by cement, so as to form a grinding surface of a perfect type. Another feature is the presence of an infolding of the enamel in the summits of the incisors, thus producing what is called the "mark." In the skull

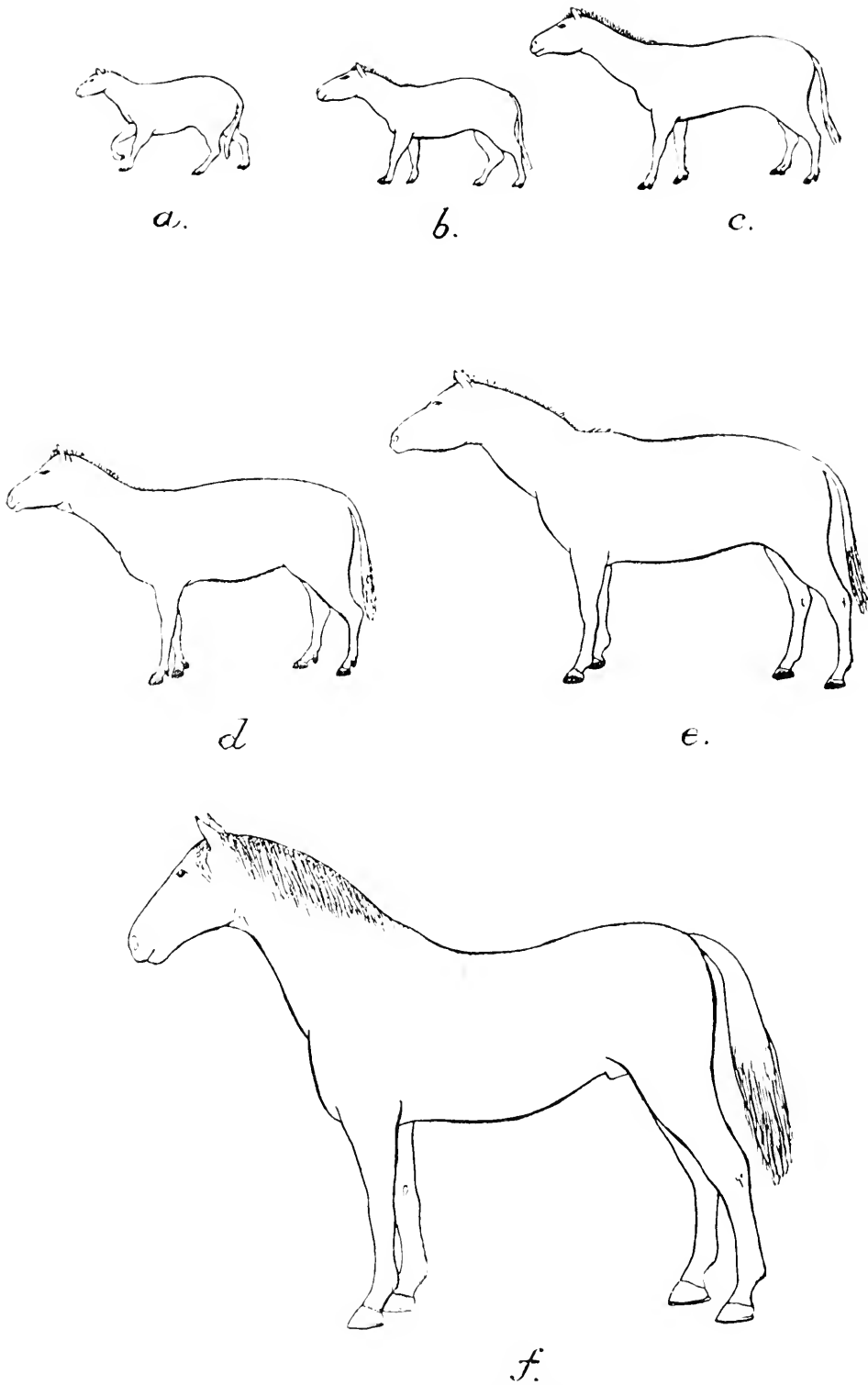
the enclosure of the socket of the eye by a complete bony ring is a feature distinctive of the group. In all existing members of the family, constituting the genus *Equus*, there is only one toe on each foot, although rudiments of lateral digits are represented by the "splint-bones" on each side of the upper end of the cannon-bones.

Dentition of the Horse. The dentition of the Horse is illustrated on one side of the table-case placed near the middle of the North Hall; the object of the specimens being to show the alterations which take place with age. In all its features the dentition displays special adaptation for the masticating of vegetable food, such as the herbage of the open plains upon which the species dwells in a state of nature. The front teeth or incisors are, for instance, used for cropping off the blades and stems of grass, while the cheek-teeth (molars and premolars) serve for crushing and breaking them into fragments. The tusks, or canines, so greatly developed in carnivorous animals, are comparatively small even in the males, and rudimentary in the females.

The complete number of teeth in the adult Horse is that characteristic of Ungulate or Hoofed Animals of the early Tertiary period, *viz.*, three incisors (*i*), one canine (*c*), four premolars (*p*), and three molars (*m*) on each side above and below, or forty-four in all. The first premolar (*p*. 1) is, however, very small, and often wanting, especially in the lower-jaw; but instances of its presence are shown in several specimens in the case; these being of interest, as remnants, on the point of disappearance, of a tooth well developed in the Horse-like Animals of ancient times.

The incisors, as mentioned above, have an infolding of the surface, constituting a deep pit (the "mark"), a feature now confined to the *Equidae*. In consequence of this pit extending only a certain depth into the crown, it becomes obliterated as the tooth wears away, so that its presence is a guide to the age of the animal. The six principal cheek-teeth are in close contact by broad surfaces fitting tightly against each other, so that they collectively form one solid mass, presenting a grinding-surface composed of substances of various degrees of hardness (enamel, dentine, and cement), interwoven into an intricate pattern so as to make most efficient natural millstones. The

FIG. 1.



THE ANCESTORS OF THE HORSE AND ITS RELATIVES COMPARED IN SIZE AND FORM WITH THEIR TYPICAL MODERN REPRESENTATIVE.

a. *Hyracotherium* or *Protorohippus*, of the Lower Eocene; *b.* *Plagiolophus*, or *Orohippus*, of the Middle Eocene; *c.* *Mesohippus*, of the Oligocene; *d.* *Merychippus*, of the Miocene; *e.* *Pliohippus*, of the Pliocene; *f.* The Modern Horse, *Equus caballus*, domesticated breed. (Lull, *Amer. J. Sci.* vol. xxiii, p. 167.)

[To face page 3.]

grinding-face of the tooth always keeps at the same level, the gradual wear of the superficial parts being compensated by the pushing outwards of the whole tooth in its socket until, as may be seen in the older specimens, nothing but the root is left.

The permanent teeth are preceded by a temporary or deciduous set of "milk-teeth" (*d.i.*, *d.m.*, &c.) ; in which there are as many incisors as in the permanent set, although there are only three cheek-teeth on each side above and below ; these milk-molars being replaced by the last three permanent premolars. The eruption, or cutting through the gums, of the deciduous teeth commences at about the time of birth, and is completed before the end of the first year, when the young animal has its full set ; the upper teeth, as a rule, appearing somewhat earlier than those of the lower jaw. The first teeth to appear are the central incisors and the molars ; between the first and second months the second incisor appears, and finally (at about nine months) the third (corner) incisor, which completes the milk-dentition. Of the permanent teeth, the first molar appears about the end of the first year, followed by the second molar before the end of the second year ; these teeth being thus in place before any of the milk-teeth have been shed. At about two and a half years the second and third premolars replace their predecessors ; and between two-and-a-half and three years the first permanent incisor appears. At three-and-a-half to four years the fourth premolar, the third true molar, and the second incisor have appeared ; while at four-and-a-half to five years the third (corner) incisor and the canine have cut the gum, thus completing the permanent dentition. Up to this period the age of the horse is clearly shown by the condition of its teeth, and for some years longer indications can be obtained from the wear of the incisors, though this depends to a considerable extent upon the hardness of the food and other accidental circumstances.

In the specimens exhibited the side view of the teeth of the right side, and the grinding-surface of the teeth of the left side are shown.

The series of skulls exhibited comprises specimens ranging in age from the unborn colt to a horse of 36 years.

Skeleton of Man & Horse.

Facing the visitor as he enters the middle of the north hall are shown in a single case the skeletons of a Man and of a Horse (N.H. 1), arranged for comparison with each other, and also to show the position of the bones of both in relation to the external surface. In the case of the Horse, the skin of the animal from which the skeleton was prepared was mounted, and, when dry, divided in the middle line, and one half, lined with velvet, placed behind the skeleton. In the Man the external surface is shown by a *papier-maché* model, similarly lined and placed in a corresponding position. The principal bones of both skeletons have their names attached, so that study of this group, besides affording a lesson in comparative anatomy, may be of practical utility to artists. The meanings of the terms pastern, fetlock, etc. are also explained in this specimen.

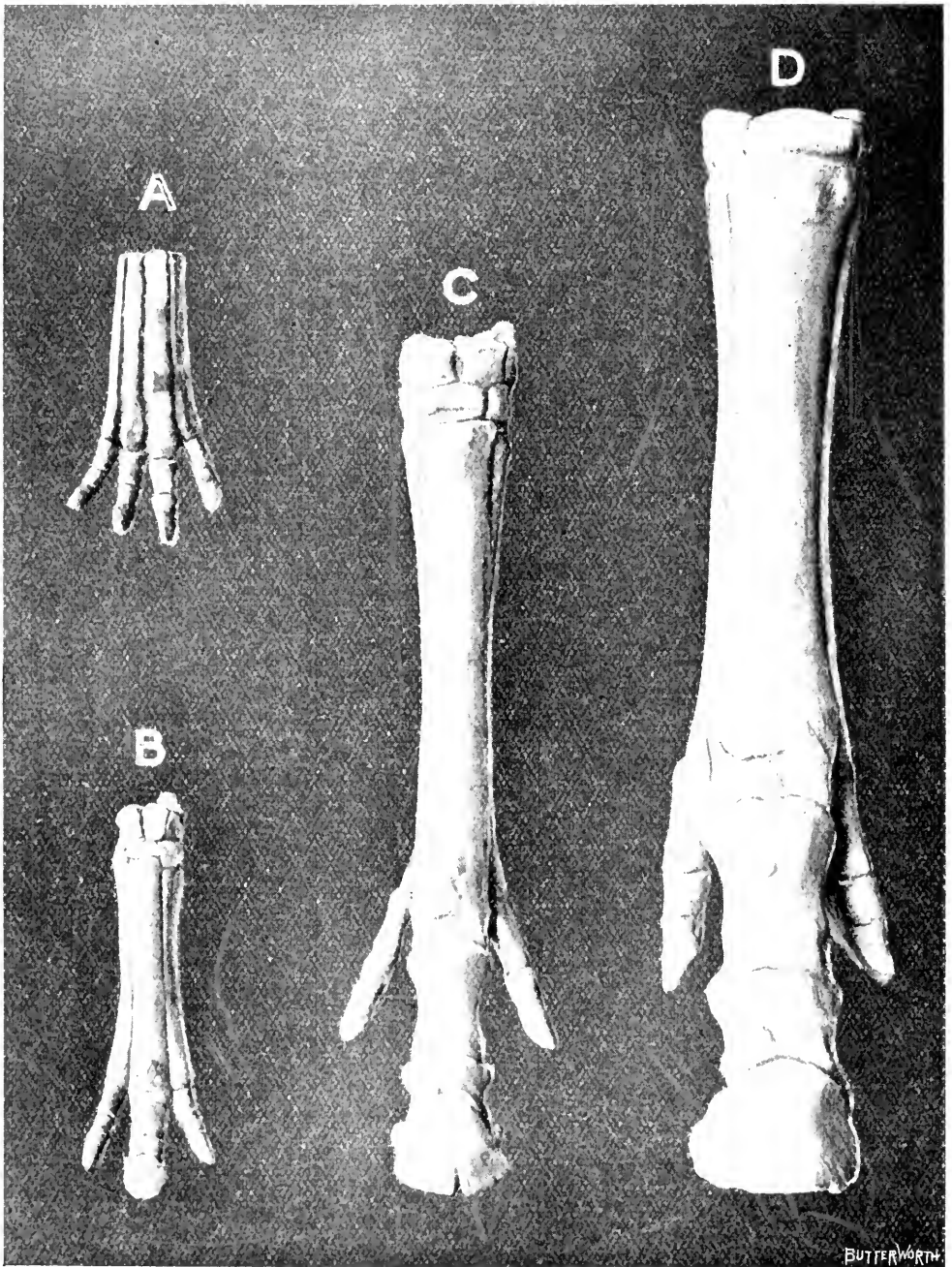
Evolution of the Horse.

Specimens illustrative of the evolution of the Horse are displayed on the north side of the table-case near the middle of the north hall; that is to say in the same case which contains, on the south side, the series illustrating the dentition of the Horse.

The evolution of the Horse (and its allies) is better known than that of any other group of Mammals. In passing from the Horse to its earlier ancestors, a gradual decrease in bodily size (fig. 1), accompanied by a shortening of the lower segments of the limb, especially of the bones of the foot, is very noticeable; at the same time there is an increase in the number of the toes, while the height of the crowns of the cheek-teeth is lowered, and their structure becomes simpler.

In the Horse, in common with the other members of the genus *Equus*, the skull (fig. 13) has the socket of the eye completely surrounded by bone, there is no distinct depression immediately in front of the same, the canine and incisor teeth are separated by a long gap from those of the cheek-series, and the crowns of the latter are very tall and continue to grow till late in life, while their grinding-surfaces are much complicated, owing to the filling-up of all the cavities with the substance known as cement. Each limb terminates in a single hoof, upon which alone the animal walks;

FIG. 2.



SKELETON OF FORE-FEET OF EXTINCT FORE-RUNNERS OF THE HORSE :
A. *Hyracotherium* (No. N. H. 65) : B. *Meshippus* (No. N. H. 57) : C. *Merychippus*,
or *Protohippus* (No. N. H. 57) : D. *Hipparion* (No. N. H. 44).

[To face page 5.

the lateral toes being represented only by the so-called "splint-bones" (fig. 7).

Remains of Horses indistinguishable from some of the various forms of the existing species occur in the superficial deposits of Europe and Asia, in company with those of the Mammoth. At a somewhat earlier epoch (Pliocene) occur Horses, such as *E. stenorhis* of Europe and *E. sivalensis* of India, in which the head is relatively larger, the feet are somewhat smaller, the splint-bones more developed, and the skull shows traces of a depression in front of the eye. The American *Pliohippus* is smaller, with shorter cheek-teeth. Still earlier (Miocene) is found in America a Horse known as *Merychippus* or *Protohippus* in which the splint-bones are fully developed and terminate inferiorly in small, although perfect, toes. In the early Pliocene *Hipparion*, or three-toed Horse, the lateral toes are still larger, while the crowns of the cheek-teeth are lower, and the skull is shorter and shows a large depression in front of the eye. In this animal the crowns of the cheek-teeth are still tall and have their hollows filled with cement (fig. 6, E), and there must consequently be some unknown forms connecting it with the Miocene *Anchitherium*, in which the crowns of these teeth are quite short, and have their hollows free from cement. *Hipparion* is generally regarded as off the direct ancestral line.

This type is common to Europe, Asia, and North America; but Mr. J. W. Gidley, in the *Bulletin* of the American Museum, has come to the conclusion that the New World Hipparions are generically distinct, and proposes that they should be known as *Neohipparion*. They differ from the Old World forms by certain details of tooth-structure, as well as by their more slender limbs, in which it seems that the lateral toes are relatively smaller. Finally, they are of Miocene, instead of Pliocene, age.

Nearly allied to *Anchitherium* is the Oligocene genus *Mesohippus*, the species of which are smaller than the typical representative of the former. In these animals the socket of the eye is open behind, the gap between the canine and cheek-teeth is comparatively short, the lateral toes are functional, and there is even a suggestion of a fourth toe in the fore-foot (fig. 2, B). This digit is fully developed in the fore-foot (fig. 2, A) of *Hyracotherium*, a Lower

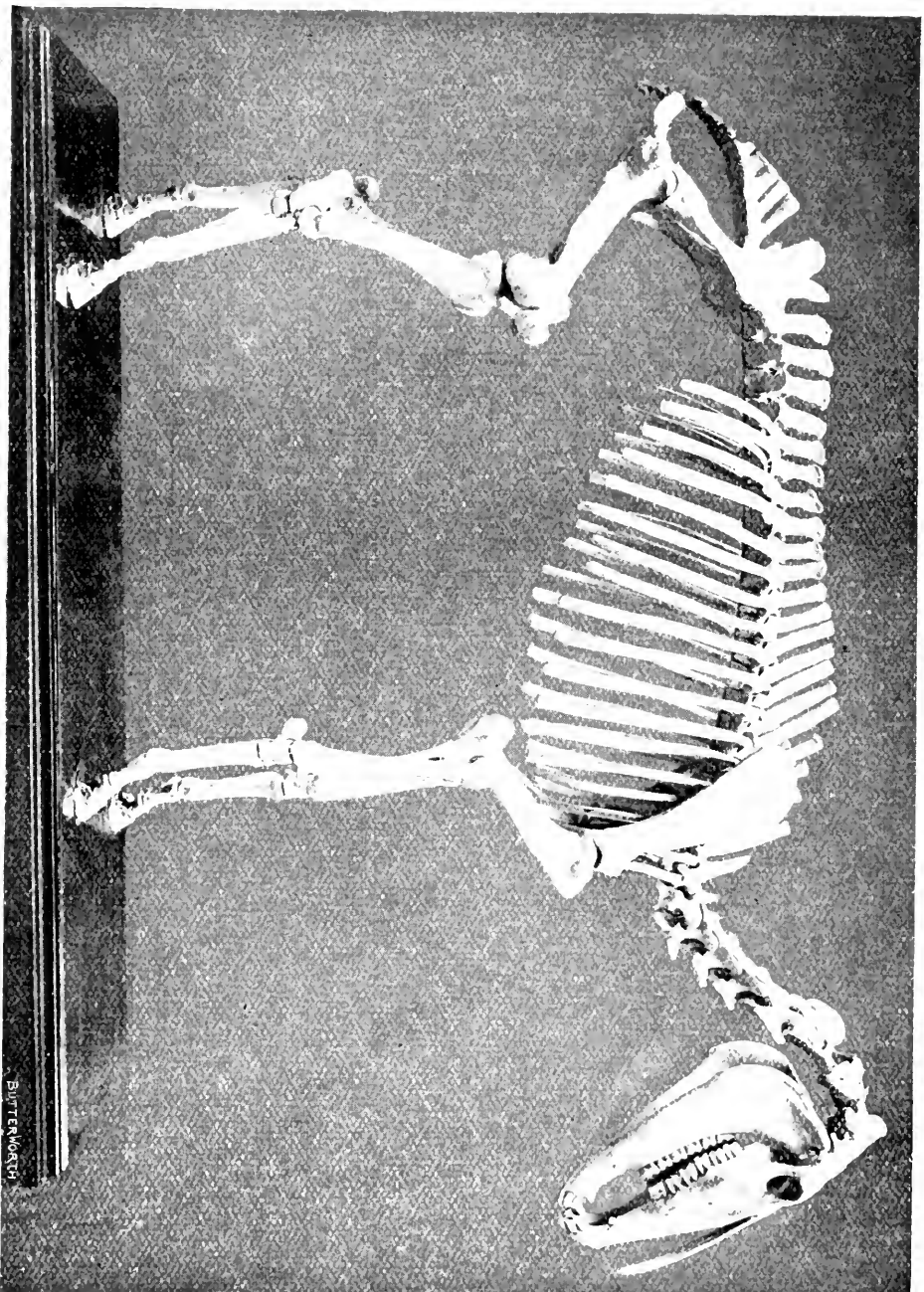
Eocene Mammal not larger than a Fox, in which the lateral digits of both feet are relatively as large as in the Tapir, while all the bones of the feet are proportionately shorter than in the Horse, and all three joints of each toe probably touched the ground. Species intermediate between *Mesohippus* and *Hyracotherium* have been named *Plagiolophus* and *Orohippus*. Farther it is not at present possible to carry the ancestry of the Horse, but there is little doubt that *Hyracotherium* is descended from a still earlier five-toed Mammal with a simpler type of cheek-teeth, and much shorter foot-bones. This hypothetical animal doubtless walked on the whole sole of its foot (plantigrade progression) instead of on the tips of the toes, and was probably nearly related to the creature known as *Phenacodus*, a cast of the skeleton of which is exhibited in the Gallery of Fossil Mammals. For further details concerning the extinct allies of the Horse see 'A Guide to the Fossil Mammals and Birds in the Department of Geology and Palæontology'.

**South American
Extinct Horses.**

The superficial (Pleistocene) deposits of South America—more especially those of the province of Buenos Aires—have yielded remains of two very remarkable equine animals, *Hippidium neogæum* and *Onohippidium munitzi*. Of the former the model* of a nearly entire skeleton (N.H. 3, fig. 3) is exhibited, while the latter is represented by a cast of the skull (N.H. 17). In both genera the cheek-teeth (as mentioned later) have shorter crowns and differ in several details of structure from those of modern Horses. As mounted, the skeleton stands 4 ft. 1 in., or $12\frac{1}{4}$ hands, at the withers, while the skull measures $23\frac{1}{2}$ in. in total length. In an average European horse-skeleton, standing 4 ft. $9\frac{1}{2}$ in., or 14 hands $1\frac{1}{4}$ in. at the shoulder, the skull-length is about $23\frac{3}{4}$ in., or practically the same as in the much smaller *Hippidium*. Although these measurements suffice to show how disproportionately large is the skull of the *Hippidium*, they by no means indicate the chief peculiarities of that animal. Comparison of the skull of the former with that of an ordinary Horse shows a most remarkable difference in the structure of the nasal region of the two species. In the ordinary Horse the nasal bones are separated from the maxillæ, or upper jaw-bones, of either side by a slit of only some

* The original of this model has been made the type of a second species, but on very slight grounds.

Fig. 3.

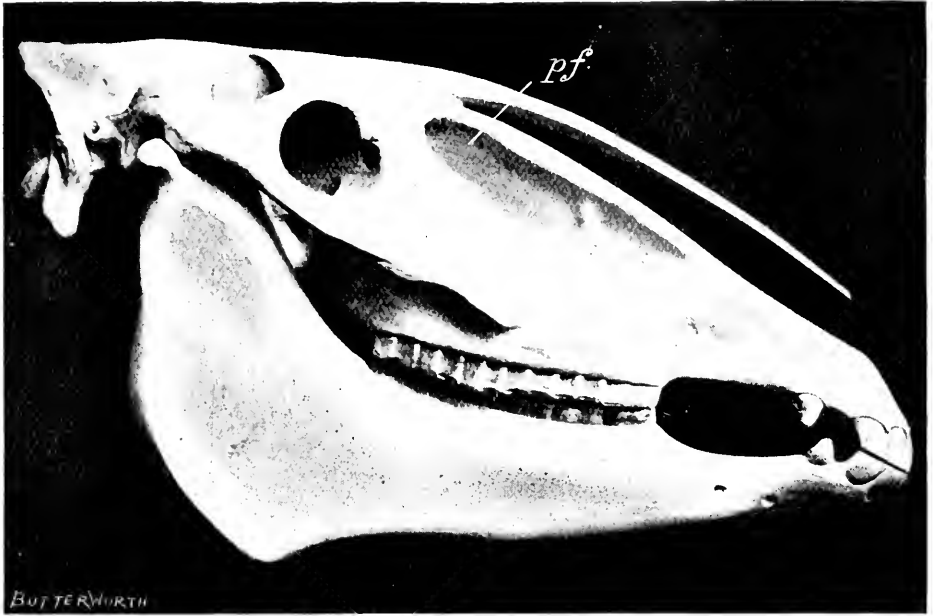


SKELETON OF *Hippidium neogaeum*, about $\frac{1}{3}$ nat. size.

(From the model in the Museum (No. N. II. 3) ; the femur, or thigh-bone, is too much inclined.)

[To face page 6.

FIG. 4.



SKULL OF *Onohippidium munizi*. (From the model in the Museum, No. N. H. 17). *pf.* preorbital fossa, or depression. About $\frac{1}{6}$ nat. size.

FIG. 5.



SKULL OF A SMALL S. AMERICAN DEER, *Pudu pudu* (No. N. H. 17), to show the preorbital fossa, or depression (*pf.*), which contains a gland. $\frac{2}{3}$ nat. size.

[To face page 7.

three or four inches in length. In *Hippidium* (as in *Onohippidium*, fig. 4), on the other hand, these slits are about $10\frac{1}{2}$ in. long, while the nasal bones themselves are proportionately long and slender. This clearly indicates that these extinct American Horses had extremely elongated noses, not improbably forming a kind of short trunk comparable to that of the Saiga Antelope.

In that animal, as well as in its relative the Chiru Antelope of Tibet, the increased size of the nasal chamber has been brought about by a shortening instead of an elongation of the nasal bones, but it is probable that in these two Antelopes and in the *Hippidium* the purpose of the modification is the same. It has been generally supposed that in the case of the Chiru the large size of the nasal chamber is an adaptation to the respiratory needs of an animal living at a very high elevation. In the case of the Saiga such an explanation would, however, obviously not hold good; and the real explanation in all three cases may perhaps be found in a special adaptation to a desert life, the long nose serving as a filter to prevent particles of sand reaching the organ of smell.

As regards the rest of its skeleton, *Hippidium* is remarkable for its short and stout limbs; this being chiefly due to the excessive shortness of the cannon-bones, which are also unusually wide, with very stout splint-bones. Each limb terminates in a single toe. These short limbs, coupled with the huge unwieldy head, indicate that *Hippidium* had less speed than ordinary ponies. There are only five lumbar, or ribless trunk, vertebræ, as in the Arabian Horse.

Two other points of interest in connection with these peculiar equine animals deserve brief reference. From the conformation of the bones of the nasal region it seems certain that neither *Hippidium* or *Onohippidium* can be derivatives from the genus *Equus*, while it is still more evident that *Equus* cannot be descended from *Hippidium*. Consequently, the reduction of the digits from three in the ancestral Horses to a single one on each foot has taken place independently in the two genera. The second point is that if the wild Horses alleged to have been seen by Cabot in Argentina in the year 1530 really were, as some suppose, indigenous, they must have been either *Hippidium* or *Onohippidium*, and not Horses of the Old World type. With the evidence afforded by the skins of the Patagonian Ground-Sloth as to the

comparatively late date to which that species survived, there is no valid reason why *Hippidium* and *Onohippidium* should not have survived till Cabot's time, especially as their hoofs have been found in comparatively fresh condition alongside the remains of the Ground-Sloth.

While the skull of *Hippidium* shows no marked depression in front of the eye-socket, that of *Onohippidium* (fig. 4) has an enormous pit in this position, with a smaller and partially detached one in front.

Teeth of Extinct Horses.

In the same case with the skull of *Onohippidium* are exhibited a few specimens (N.H. 34) illustrating the structural differences in the upper cheek-teeth of some of the later members of the *Equidæ*, and also the marked difference between an unworn and a worn molar of *Equus caballus*. The specimen marked A (fig. 6, A) is an unworn molar tooth of the latter species, with the infoldings of the crown not yet filled with the cement, which is developed later. D (fig. 6, D) shows the condition of a similar tooth which has been some time in use. The summits of the columns coloured red in A have been worn away in D so as to expose the dentine or ivory (red) forming the interior of the tooth; the infoldings on the crown, of which the central ones are converted into islets, being filled with cement (blue). The enamel, forming the proper external surface of the tooth, is left of the natural colour. Specimen C (fig. 6, C) is a half-worn tooth of the above-mentioned extinct South American *Hippidium*, in which the two disks (anterior and posterior pillars) on the lower border coloured red are more alike than in *Equus*; the whole crown of the tooth being also shorter. Specimens B and E are respectively slightly worn and half-worn teeth (fig. 6, B & E) of the European Three-toed *Hipparion*. In these the anterior pillar (*a*) is isolated from the rest of the crown, thus indicating that the genus is off the direct line of ancestry of the modern representatives of the Horse family.

Callosities or "Chestnuts."

Although it is unnecessary to discuss the general structure of the *Equidæ*, it is important to mention that all members of the Horse tribe have a bare patch of hardened skin on the inner side of the fore-leg, situated some distance above the carpus, or "knee." In the Horse a similar but smaller callosity, or "chestnut" generally.

FIG. 6.

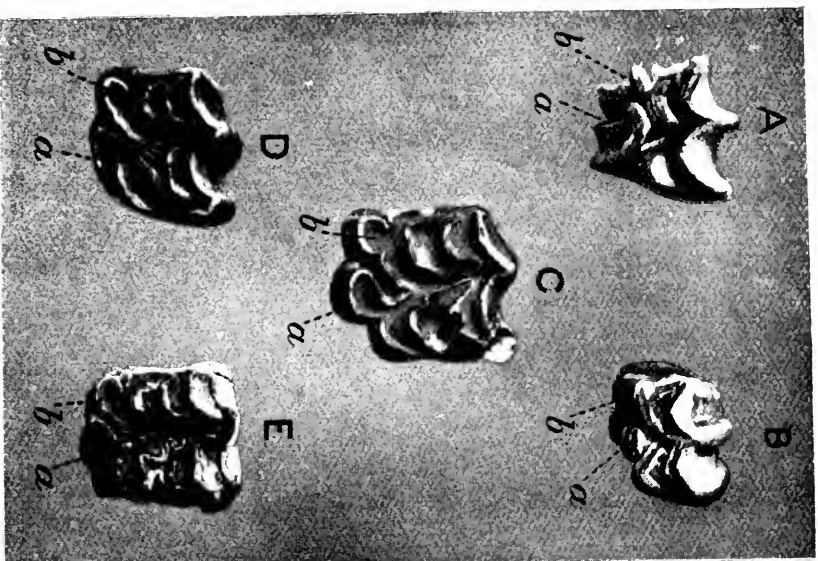


FIG. 7.



UPPER SURFACES OF MOLAR TEETH OF
Equus (A. & D.), *Hippidium* (C.), and
Hipparion (B. & E.) (No. N. II. 34).
a, anterior; *b*, posterior pillar.

(From specimens in the Museum.)

BACK OF THE FORE AND HIND CANNON-BONES
 AND SPLINT-BONES OF A SHIRE HORSE
 (No. N. II. 38).
 1 & 2. Bones of the rudimentary lateral toes.

[To face page 8.]

occurs on the inner side of the hind-limb some distance below the tarsus, or hock (fig. 8). This hind-callosity is absent in certain ponies from Iceland and the Hebrides as well as, it is reported, in some horses from North Africa; and is always wanting in the Ass, the Zebras, and all other members of the family. The front callosity is more warty in the Horse than in any other species of the family.

These structures are evidently of the type commonly called rudimentary, that is to say, they are the decadent remnants of organs once functional. They have been regarded as representing glands. Important evidence in favour of this view is the fact that when cut the callosities yield a fluid which will attract other horses, and will likewise cause dogs to keep quiet when the premises of their masters are invaded; such a fluid being almost certainly derived from an ancestral scent-gland.

Specimens of the legs of the Horse (N.H. **71**, **72**), Ass (N.H. **69**, **70**), and Zebra (N.H. **68**) are exhibited in the large case in the central archway on the north side of the hall to illustrate these remarkable structures. Near by are shown in spirit portions of the hind-legs of two unborn colts (N.H. **96**, **96 A**) in order to demonstrate that the position of the callosity (fig. 9) is the same as in the adult, and thus to refute the suggestion that these structures represent one of the foot-pads of less specialized Mammals.

In the same case are displayed specimens of the limbs of Deer with glands situated in positions not very dissimilar to those occupied by the callosities of the Horse.

In old veterinary books the callosities, which were supposed to be due to disease, are called *sallenders* (from the French *Solandre*), or *mallenders*. They are sometimes called "castors."

The Ergot. The true representative of a foot-pad is the "ergot," or small horny knob projecting from the hind surface of the fetlock of the Horse. A specimen (N.H. **93**, fig. 10) showing this is displayed in the same case, where the foot of a Tapir (N.H. **94**, fig. 11, A) and another of a Dog (N.H. **95**, fig. 11, B) are also exhibited, in order to show the correspondence of the central pad with the Horse's ergot.

"Horned Horses." In this place certain interesting abnormalities which occasionally make their appearance in Horses may be conveniently noticed. The most remarkably of these are connected with the skull. The specimens exhibited include

the skull of an English Horse (N.H. 45) presented by Mr. Hanbury Carlile, showing rudiments of a pair of horns on the forehead. Of three other specimens of the same type, one is the frontal region of the skull of an ordinary English Horse (N.H. 44) showing the pair of rudimentary horns in precisely the same position as in the first specimen, but of somewhat larger size. The other two are models of the foreheads of Thoroughbreds (N.H. 46, 47), each showing a pair of similar horns, situated as in the preceding specimens. These are important as showing that the skin extends uniformly over the horn-like processes, without any trace of a dermal horn; the same condition being observable in the other two examples. The significance of these horn-like growths is at present inexplicable, seeing that none of the ancestral Horses, or even of the collateral branches of the Horse-stock, were horned animals. This makes it the more difficult to understand why the projections in all the four specimens above referred to should be so similar in form and position.

**Bones of
the Foot.**

The next abnormalities to be mentioned are connected with the foot-bones of Shire Horses, as represented in the feet of "Blaisdon Conqueror," formerly owned by Mr. Peter Stubs and of two other Horses of the same breed presented respectively by Lord Wantage and Lady Wantage. In the skeleton of "Prince Henry," presented by Lady Wantage, only the bones of the limbs on the left side (N.H. 38) have been preserved; but in both the front and hind cannon-bones (fig. 7) of that side the two lateral splint-bones (the metapodials of anatomists) are unusually large and stout. In place of terminating, as in many ordinary Horses, about two-thirds down the shaft of the cannon-bone, or even less, in thin narrow slips, they extend fully four-fifths the length of the latter, where they end in large triangular processes inclined markedly outwards. Although these terminal projections are immovably welded to the splint-bones, their structure is such as to indicate that they represent distinct elements, consisting of two or three pieces each; and there can be no doubt that they really correspond to the lateral toe-bones (phalanges) of the extinct Hipparion. In other words, Lady Wantage's Shire may be said to be a veritable three-toed Horse,

FIG. 8.

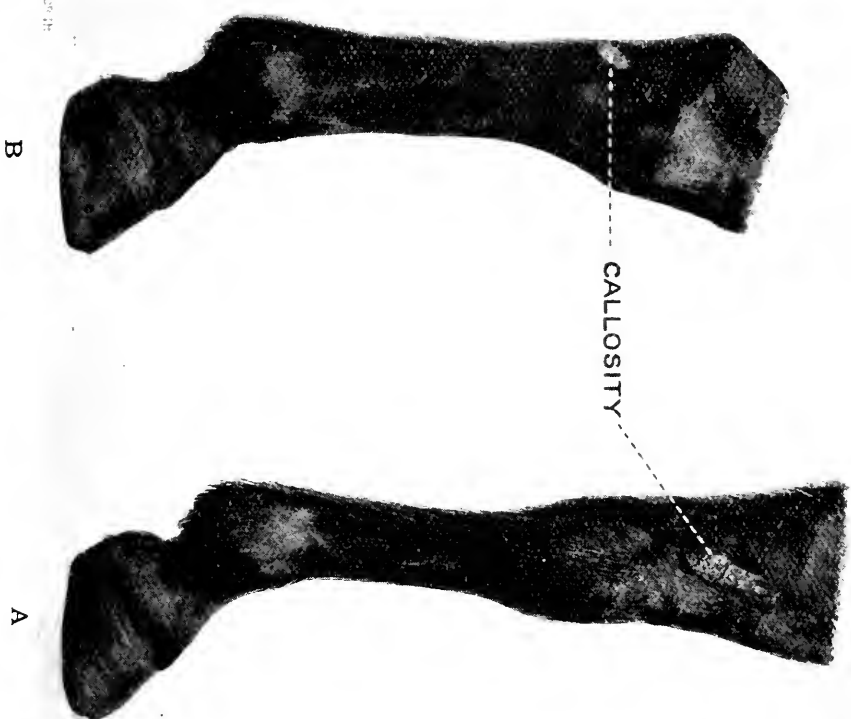


FIG. 9.



THE CALLOSITIES ON THE FORE- (A.) & HIND- (B.) LEGS
OF THE HORSE (Nos. N. H. 71, 72).

THE CALLOSITY ON THE FORE-LEG
OF AN UNBORN COLT (No. N. H. 86).

(From specimens in the Museum.)

FIG. 10.

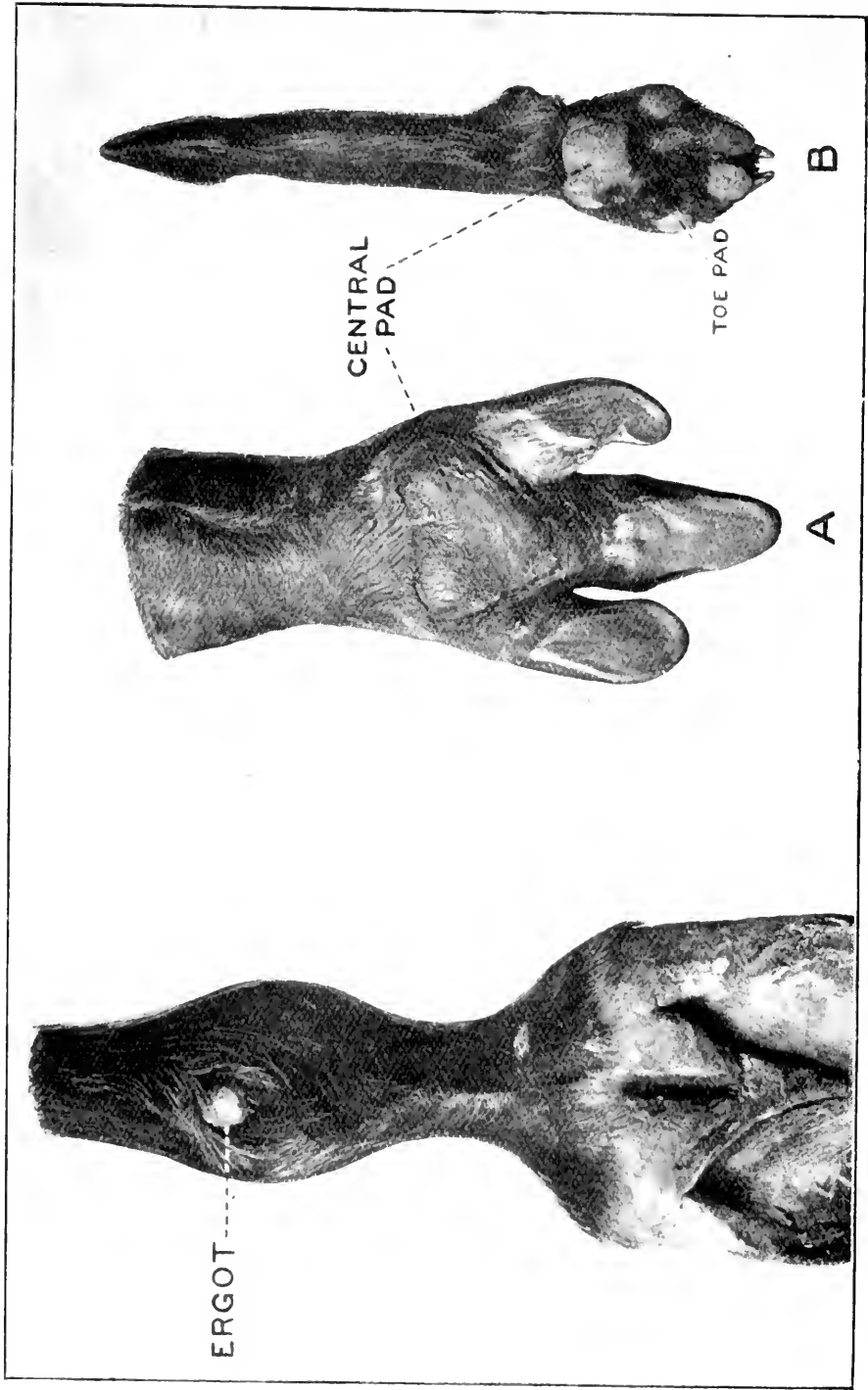


FIG. 11.

HORSE.
HIND SURFACE OF THE FOOT OF A HORSE,
TO SHOW THE ERGOT (No. N. II. 93).

TAPIR.
FORE-FOET OF A TAPIR (A), AND A DOG (B), TO
SHOW THE PAD CORRESPONDING WITH THE
ERGOT OF THE HORSE (Nos. N. II. 94 & 95).

in which the bones of the rudimentary lateral toes were buried in the skin and welded together. It is noticeable that, in both the fore and hind foot, the outer rudimentary toe-bones are much more developed on the left than on the opposite side.

If this were all, it might be considered that the Shire "Prince Henry" was merely a solitary instance of reversion towards the ancestral type in foot-structure, and, although even this would be a matter of considerable interest, yet it would have little or no special bearing on the ancestry of the breed in general. Since, however, the cannon-bones of "Blaisdon Conqueror" also display an equally large development of the splint-bones, which show traces at their lower ends of distinct vestiges of the toe-bones, although by no means in so pronounced a degree as in "Prince Henry," the peculiarity seems to be more deeply seated. It is true, indeed, that in the case of the feet (N.H. **77, 78**) and limb-bones (N.H. **79, 80**) of a Shire colt presented by Lord Wantage, it has to be admitted that these are abnormal and more or less malformed; yet, the fact remains that they show not only traces, but a relatively high degree of development of the lateral toes, of which the constituent bones are separate, while the terminal one on one side of each limb has a hoof of its own. The reversion to the ancestral type is thus very strong. In both feet of this colt the lateral (2nd and 4th) metacarpal bones (usually represented only by the so-called splint-bones) are complete, though varying in size, and carry one toe-bone each.

Although this abnormal specimen was selected and presented to the museum on account of its peculiarities, yet, after making allowance for this, there is the remarkable fact that three skeletons of Shire Horses exhibit more or less strongly developed rudiments of the lateral toes of the extinct three-toed Hipparion. The obvious inference is that this is a characteristic of the breed.

To confirm or disprove this idea requires, however, the limb-bones of a considerable series of pedigree Shires. Of special value would be the limb-bones of very young colts, in which the rudimentary toe-bones might be separate and more fully developed than in the adult. As matters already stand, a further inference may, however, be drawn from these rudimentary toes in the Shire Horse. As already stated, in many Horses the splint-bones

terminate inferiorly in thin scale-like extremities. In some instances, however (as in the fore limb of Stockwell, exhibited in a wall-case), they have a small flat expansion at the lower end, and from the evidence of the Shire Horse bones these expansions may be definitely identified with the lateral toe-bones of the three-toed ancestors of the Horse. In a certain sense, therefore, a considerable number of existing Horses are really three-toed animals.

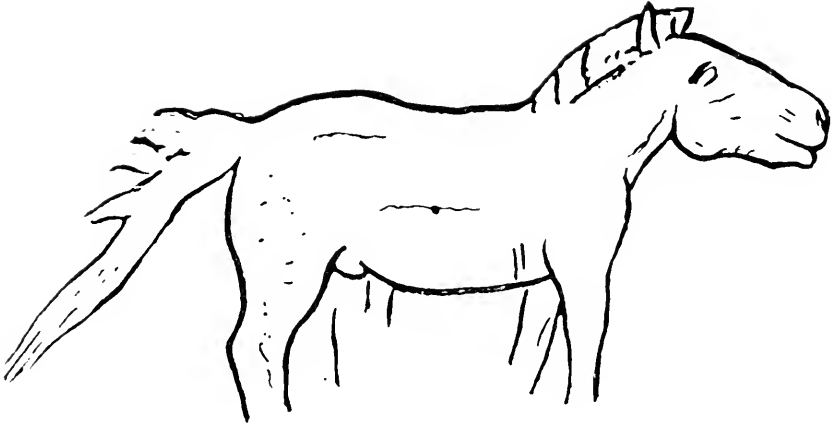
Whether the highly developed condition of the splint-bones and rudimentary toe-bones of the Shire Horse indicates an ancestry for that breed distinct from either the Arab thoroughbred stock on the one hand, and the ordinary North European stock on the other, or whether it is merely a kind of reversionary redundancy due to the large size and vigour of the Shire, is difficult to decide.

Variation of another type has formed the subject of a paper by Mr. O. C. Bradley in the *Proceedings* of the Edinburgh Physical Society. The trapezium of the carpus of the Horse is the structure discussed; and it is shown that this bone is present, either in one or both limbs, in about 50 per cent. of the skeletons examined, while if each carpus be taken separately (that is, without reference to the condition in its fellow) the percentage is a little more than 40. This, in conjunction with its minute size, leads to the conclusion that in the evolution of the single-toed foot of the Horse the bone in question is following in the steps of the lateral metacarpal (splint-bone) with which it was originally connected.

**Variation in the
Shape of the
Hoof in the
Horse Family.**

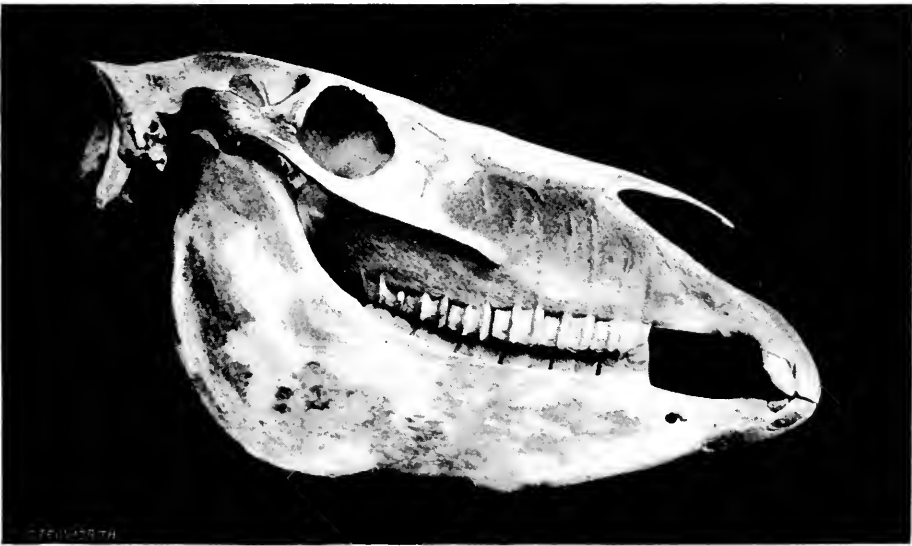
Another point of interest is the existence of a considerable amount of difference in the structure of the hoof in the various members of the Horse tribe; this being illustrated by a series of specimens (N.H. 81-89) in the large case on the north side of the North Hall. In the Horse (*Equus caballus*) the "frog," or central cushion is reduced to a narrow ridge, deeply grooved posteriorly, which does not extend behind the case of the hoof, and is not applied to the ground. In Grévy's Zebra (*E. grevyi*), of North-east Africa, the frog becomes much broader, with scarcely any trace of the groove, and its hind part touches the ground. In the Kiang (*E. hemionus kiang*), of Tibet, the posterior development of the frog becomes more marked, so that a considerable portion projects behind the case of the hoof and

FIG. 12.



THE CAVE-HORSE: from a Prehistoric Sketch.

FIG. 13.



SKULL OF THE MONGOLIAN WILD HORSE, FEMALE (No. N. H. 16).

[To face page 12.

touches the ground; the cleft being narrow and deep. A still greater development of the hind part of the frog occurs in the Ass (*E. asinus*). In the extinct South American *Onohippidium* the frog is somewhat intermediate between the Horse and the Ass type, being grooved and not projecting behind the case of the hoof, but being of considerable breadth and thickness. In the Bonte-Quagga or Burchell's Zebra (*Equus burchelli*) of South and Eastern Africa the medium-sized and slightly cleft frog is deeply sunk in the hoof, behind which it projects to a small degree; not touching the ground, except when the hoof is much worn.

Characteristics of the Horse. Coming to the characteristics of the Horse itself, as typified by the domesticated Scandinavian breed, the species is distinguished by the tail being abundantly covered with long hair up to the root and the general presence of bare callosities or, "chestnuts," on the inner side of both pairs of limbs. The mane, which has a forelock on the forehead, is long and pendant, the ears are relatively short, the head small, the limbs long, and the hoofs large and broad, especially the front pair, which considerably exceed the hind ones in this respect. Normally there are no distinct colour-markings; although dark bars are not unfrequently seen on the legs, and more rarely on the shoulders, of dun-coloured individuals.

This definition requires, however, some amount of modification when the wild representatives of the species are taken into consideration. The following main types or races of the Horse may be recognized, of which the first is:—

The Cave Horse. The Cave Horse, *Equus caballus spelæus*, a race typified by bones and teeth from the cavern of Bruniquel, Tarn-et-Garonne, France, described by Sir R. Owen in the *Philosophical Transactions of the Royal Society* for 1869, and exhibited in the Geological Department. It was then supposed to indicate an animal of about $13\frac{1}{2}$ hands in height, but the relatively large size of the cheek-teeth of the next race indicates that it was probably much smaller. Prehistoric sketches from the Cave of La Madelaine, in the Dordogne, south of France (fig. 12), show that this race was practically identical with the living Wild Horse of Mongolia, having the same relatively large

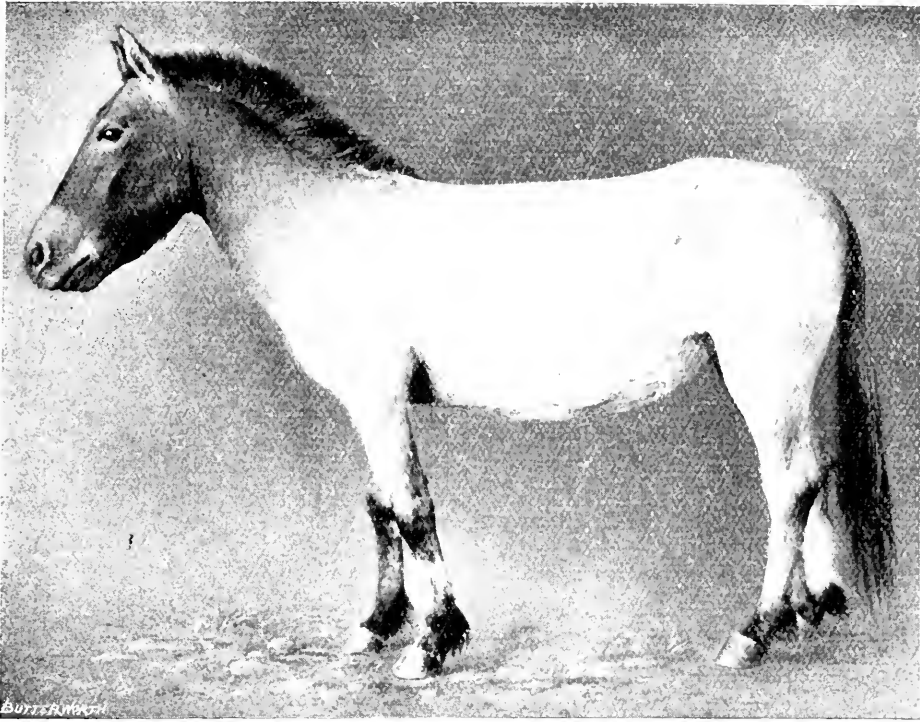
head, absence of forelock, upright mane, and tail sparsely haired at the root. Indeed, the grounds for separating this race from the next are based on considerations of nomenclature and convenience rather than on structural differences. Nevertheless, the cheek-teeth appear to be relatively and absolutely smaller in the cavern race, the length of the row of six upper teeth in a specimen from Bruniquel being about $7\frac{1}{4}$ inches.

Skulls from the superficial deposits of Walthamstow, Essex, of which one (N.H. **18**) is exhibited in the table-case, probably indicate a race nearly allied to, if not identical with, the Cave-Horse. As in the Mongolian Wild Horse, the face is bent downwards only in a slight degree on the line of the basal axis of the skull.

**Mongolian
Wild Horse.**

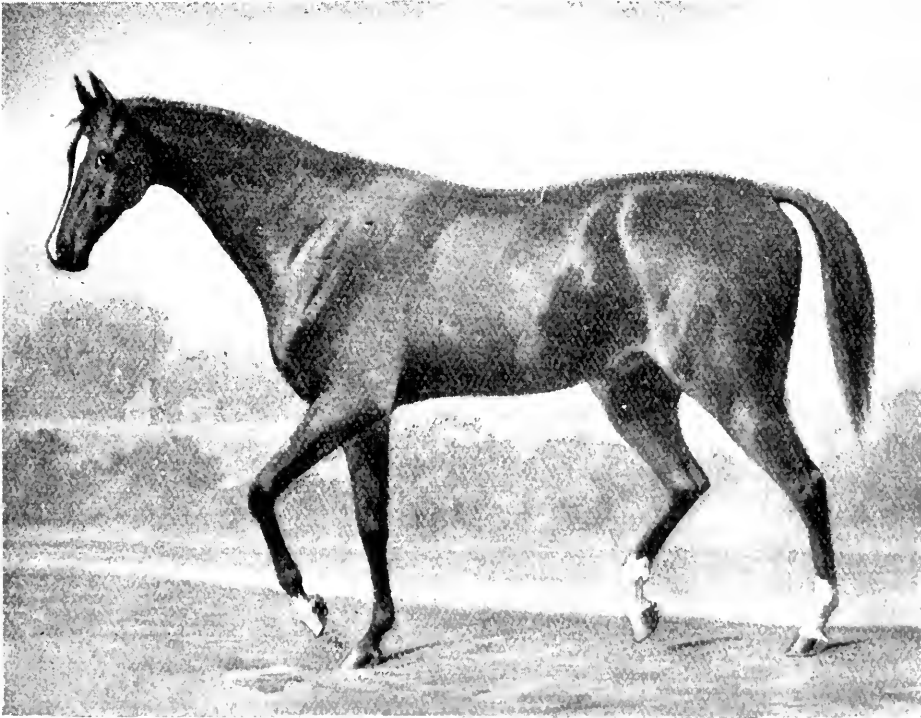
The Mongolian Wild Horse (*Equus caballus przewalskii*, fig. 14) is a small race, standing about 12 hands at the shoulder, and characterised by the root of the tail being short-haired, a short upright mane, the absence of a forelock, and the yellow dun or somewhat rufous body-colour, with the mane and tail black, the legs dark brown or black, at least as high as the fetlocks, a narrow dark stripe down the back, and generally (probably always when pure-bred) a white muzzle. The head is relatively large, especially as regards the face, the ears are proportionately tall, and the hoofs rather narrow. The interval between the first upper cheek-tooth and the outermost incisor is relatively very short. The cheek-teeth (fig. 16, A) are both absolutely and relatively very large, the length of the upper row of six in a skull with a basal length of $18\frac{7}{8}$ inches being $7\frac{1}{2}$ inches, or only one-quarter of an inch less than in the skull of the Shire Mare "Starlight" (N.H. **23**, fig. 16, B), of which the basal length is 23 inches. Other distinctive features of the upper cheek-teeth are the absence of complex foldings in the enamel and the relatively large size (antero-posteriorly) of the anterior pillar (*a*), which is produced considerably in advance of the point of connection with the main body of the tooth, and is much flattened on the inner side. This feature is most pronounced in the premolars. The large relative size of the cheek-teeth is illustrated by comparison with those of a Dartmoor Pony skull (N.H. **27**),

FIG. 14.



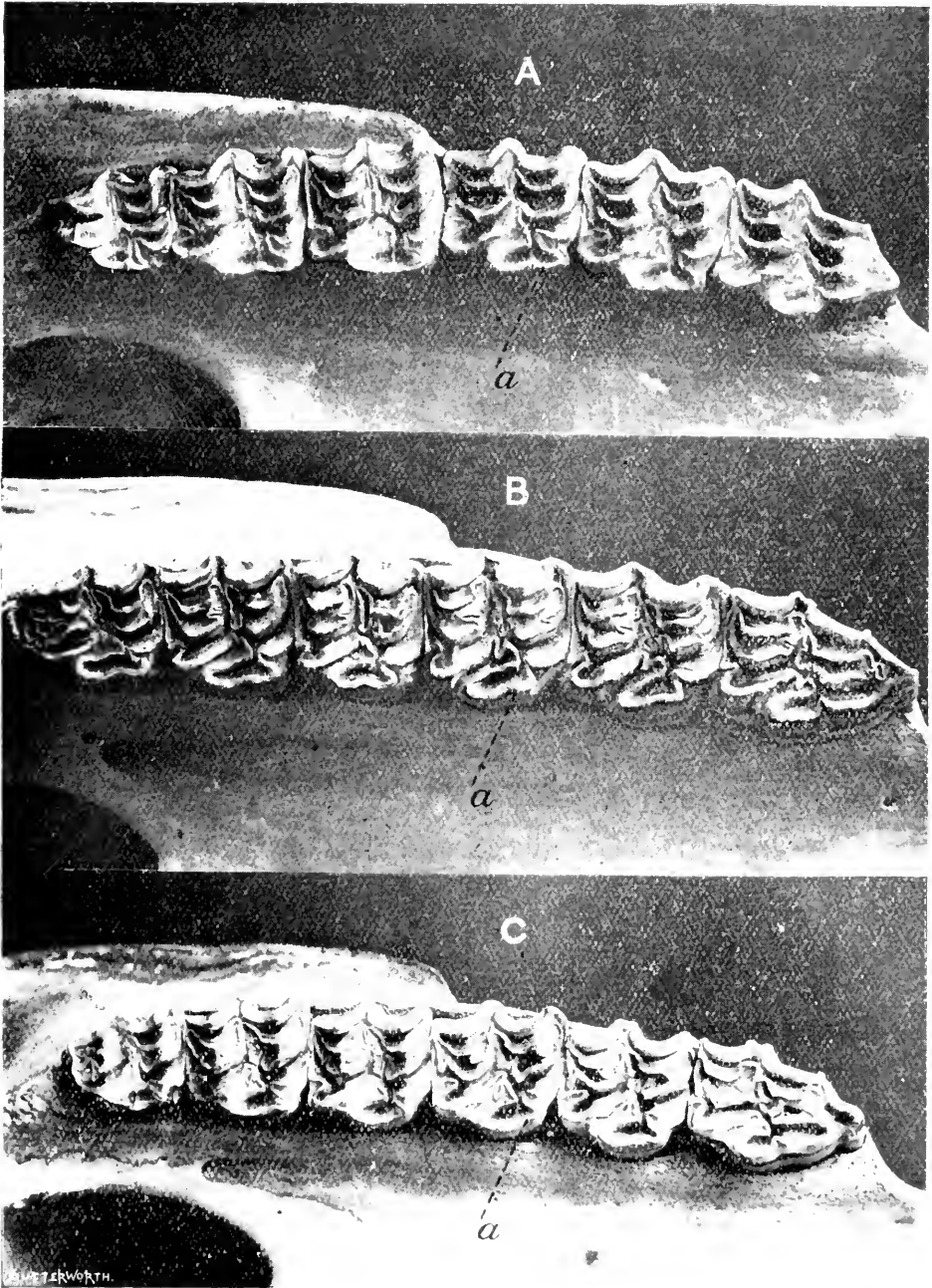
THE MONGOLIAN WILD HORSE.
(From the female specimen presented by the Duke of Bedford)

FIG. 15.



THE DARLEY ARABIAN.
From the original picture at Aldby Park, York.

Fig. 16.



RIGHT UPPER CHEEK-TEETH OF THE MONGOLIAN WILD HORSE, (A); A SHIRE HORSE, (B); AND AN ARAB, (C) $\frac{1}{2}$ nat. size. *a*, anterior pillar.

[To face page 15.

but little smaller than that of the female skull of the Mongolian Wild Horse. In the Dartmoor Pony the length of the tooth-row is only $5\frac{3}{4}$ inches.

In addition to the length of its facial portion, the skull of the Wild Horse here exhibited (N.H. 16, fig. 13) is characterised by the absence of any distinct vestige of a depression in front of the eye-socket, and by the slight extent to which the face is bent down on the basi-cranial axis, so that a continuation of the line of the latter will cut the face above the aperture of the nose-cavity*.

In some instances there are indistinct transverse barrings on the legs, and there may be faint indications of a shoulder-stripe.

In its typical form the Wild Horse appears to be restricted to the Gobi Desert and perhaps some of the neighbouring districts; but the Wild Horses formerly inhabiting the Kirghiz Steppes and known as Tarpan, were evidently near akin. They were probably, however, crossed to a greater or less degree with escaped domesticated Horses; and the few skins which have been preserved show decisive evidence of mixed blood in their mouse-coloured coats, such a tint among Horses being a sure indication of cross-breeding. In the early part of last century, when Tarpan were still numerous on the Kirghiz Steppes, the Tatars asserted that the pure breed was to be met with only to the far eastward, in Central Asia—that is to say the Gobi Desert; and it accordingly seems probable that the Mongolian Wild Horse itself ought properly to be called Tarpan, or, in the plural, Tarpani.

A small Horse living in London in the early part of last century and stated to have come from the heart of China was named *Asinus equuleus* by Colonel Hamilton Smith. If, as seems possible, this animal was a true Wild Horse, the name *equuleus*, as the earlier, should replace *przewalskii*.

* Prof. J. C. Ewart, *Trans. Roy. Soc. Edinburgh*, vol. xlv, 1907, p. 555, and *Quarterly Review*, April 1907, p. 547, has made the Mongolian Wild Horse the type of a so-called "Steppe-group" characterised by the marked deflection of the facial portion of the skull as compared with the basal axis. No such feature is, however, presented by any of the skulls of this race in the Museum Collection, although it is apparent to some extent in the one figured in the first of the two memoirs mentioned.

A mounted specimen of a female of the Wild Mongolian Horse (M. 1012, fig. 14) is exhibited in the Lower Mammal Gallery, and the skeleton of a young stallion is installed in the North Hall, where the two halves of the skull of the mare are also shown.

Some of the Kirghiz Tarpan lacked the hind chestnuts (which are small in the Wild Mongolian Horse); and these structures appear to be constantly lacking in a breed of small Horses or Ponies ranging from Connemara, the Outer Hebrides, Iceland, and the Faroes to Western Norway. For this breed the name of Celtic Pony, or Celtic Horse (*Equus caballus celticus*) has been proposed; but since it has also been regarded as nearly related to the Kirghiz Tarpan*, it seems doubtful whether it is worthy of racial separation from *E. c. przewalskii*. The Celtic Pony, or Fjordhest as it is called in Norway, has been described as follows:—

The ordinary colour is pale buff, but may be mouse-grey, or even brown; the mane is light-coloured externally, with a central black core, and the tail is also light-coloured with a certain admixture of black hairs. The winter coat is very rough and shaggy, with a large forelock and tuft of hair under the lower jaw, and long bushy hair at the root of the tail. The forehead is broad, and the facial portion of the head relatively short; while the legs are relatively slender and the hoofs small. The absence of hind callosities has been already noted. Another feature is the small size or absence of the canine teeth, or tusks, of the stallion. Shetland Ponies, when young, exhibit the same lateral expansion of the hair at the root of the tail.

The Northern or Dun Type. Whether the Celtic Pony is a separate race or merely a modified and domesticated Tarpan, there can be no question that the dun type, as typified by the Norwegian Dun Pony, is a distinct race. As no particular breed was specified in the original Linnean description of the domesticated *Equus caballus* as the type of the species, it may perhaps be permissible to regard the Dun Pony of Norway in this light, despite the fact that it has been attempted to give this position

* Stejneger, *Smithsonian Miscellaneous Collections*, vol. xlviii, p. 467 (1907).

to the Arab*. If this be admitted the Dun Pony should be called *Equus caballus typicus*.

These Ponies are evidently related to the Wild Mongolian Horse, but have a fuller development of the mane and tail, which are wholly black, although specimens may occasionally be seen in England in which the hairs on the root of the tail are shorter than usual. In some cases there is a dark stripe down the back and traces of barring on the legs. The facial portion of the head is longer, and the hoofs are relatively larger than in the Celtic Pony.

This breed may be regarded as probably derived from the Wild Mongolian Horse, and likewise as the main ancestral stock of the ordinary domesticated Horses of North-western Europe. In the skulls of ordinary domesticated Horses the cheek-teeth are, both absolutely and proportionately, much smaller than in the Wild Horse. When Arab blood is presumably absent, there is no trace of a distinct impression in front of the socket for the eye; and in some instances the facial portion of the skull is not markedly bent down on the basal axis. This bending-down of the face on the line of the basal axis may, however, occur in domesticated Horses of all breeds. Skulls exhibiting different degrees of development of this feature are shown in the case in the central arch of the north hall. One of these skulls was obtained from the Roman Fort at Newstead near Melrose, where specimens exhibiting various degrees of bending-down of the face were found (see J. C. Ewart, *Trans. Royal Society Edinburgh*, vol. xlv, 1907).

The relatively smaller head and still smaller cheek-teeth, the shorter ears, the presence of a fore-lock, the larger and pendent mane, the more fully haired tail, and the wider hoofs which distinguish the ordinary Horses of Western Europe from the Wild Horse may be regarded in all probability as due, at any rate to a great extent, to the effects of domestication, although there is also the possibility that they may in some degree be due

* See Stejneger, *op. cit.* p. 470, note. Osborn, on the other hand (*Bull. Amer. Mus.* vol. xxiii, p. 262, 1907), adopts the view here advocated, and uses the name *E. africanus*, Sanson for the Arab: this name is, however, preoccupied by *E. asinus africanus* of Fitzinger.

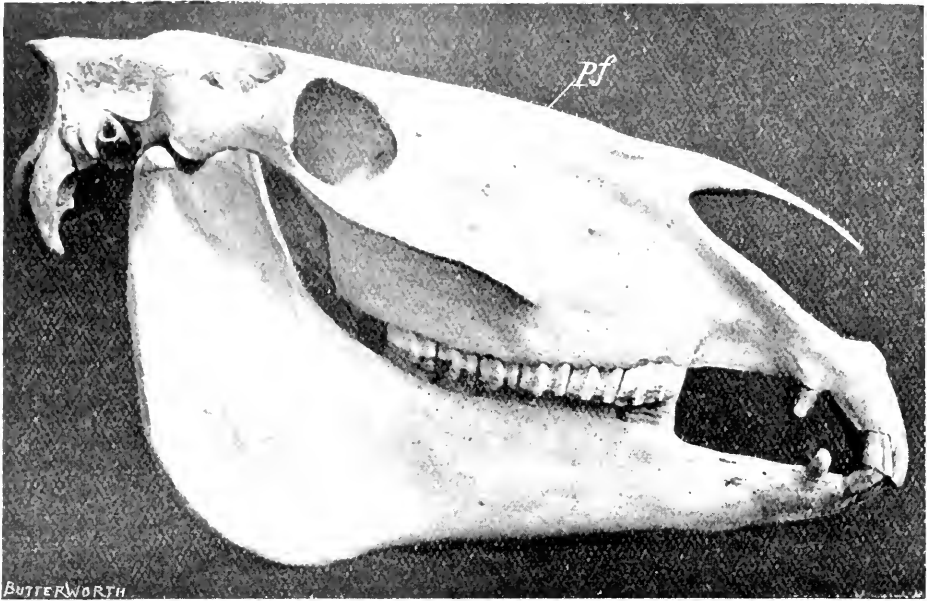
to the infusion of Arab blood. Much the same may be affirmed with regard to the bending down of the face on the basal axis of the skull.

In a publication recently issued by the Philomathic Society of Alsace-Lorraine * Dr. Max Hilzheimer gives an illustrated description of a remarkable and apparently ancient breed of horse to be met with in the neighbourhood of Schlettstadt, in Upper Alsace, where it is locally known as Riedpferd (Reed Horse) or Pickerle. Small in stature, and of all colours except grey, it frequently shows a dark dorsal stripe, while in one foal the last remnant of a transverse shoulder-stripe was observed, such a vestige being sometimes noticeable in the Wild Mongolian Horse. In its large and clumsy head, with a broad forehead, and a tendency to a concavity in a profile near the base of the nasal bones, the Schlettstadt Horse likewise approaches the wild race, as it also does in its short ears and low withers. On the other hand, in its profuse mane and tail it makes an equally wide departure from the latter, although there is every probability that these features are the result of domestication. Dr. Hilzheimer refers to an account by Elisæus Rösslin, in a work on Alsace-Lorraine, published at Strassburg in 1593, of so-called Wild Horses inhabiting the mountains of the Black Forest. These are known to have survived till 1616, when three were shot during a hunt. Although these so-called Wild Horses were probably the descendants of domesticated animals they were doubtless a primitive type, from which, in Dr. Hilzheimer's opinion the Schlettstadt breed may be descended. A further inference is that in the latter we have survivors of the Wild Horse of the Swiss lake-dwellings and of the cave period.

The Southern The Southern or Barb type (*Equus caballus asiaticus*,
 or or *E. c. libycus*), as represented by Barbs, Arabs,
 Barb Type. Thoroughbreds, etc., constitutes the fourth and last
 well-defined group of Horses. In this breed, as we now know it,
 bay with black "points," and not unfrequently a white star on

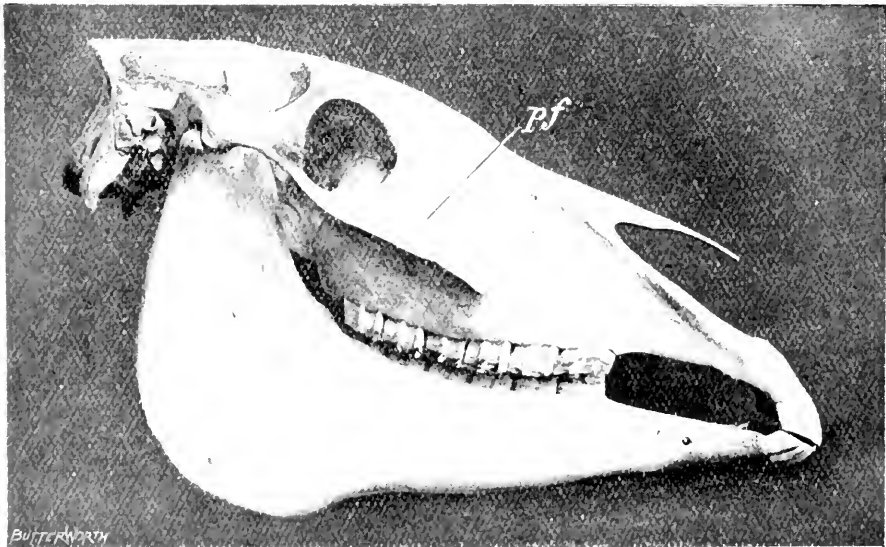
* *Mitteil. Philom. Ges. Elsass-Lothringen*, vol. iii, p. 368, 1906.

FIG. 17.



SKULL OF THE SHIRE STALLION "BLAISDON CONQUEROR" (No. N. II. 8).

FIG. 18.



SKULL OF AN ARAB MARE, SHOWING THE CHARACTERISTIC SINUOUS PROFILE. (From the specimen, No. N. II. 20, presented by W. Scawen Blunt, Esq.)

[To face page 19.

the forehead may be regarded as the typical colour, although grey is by no means uncommon; and the mane and tail are always long, pendent, and full. The fetlocks of one or more legs are not unfrequently white.

The skull generally, if not invariably, shows a slight depression in front of the socket of the eye (fig. 18, *pf.*), which although now serving as the attachment for the muscle running to the nostril, probably represents the cavity which almost certainly contained a face-gland in the skull of the extinct *Hipparion*. Many of the dark-coloured Horses of Europe have Barb or Arab blood in their veins, this being markedly the case with the Old English Black, or Shire Horse, the skull of which accordingly shows a distinct depression in front of the eye-socket (fig. 17, *pf.*). That the face-gland may well have disappeared in modern Horses is exemplified by Sheep, the domesticated breeds of which possess this structure, although it is lost in the wild American Bighorns. In the latter the place where the gland should be situated is probably occupied by muscle. As two instances are known to the writer in which modern Horses (one an Argentine) have developed functional face-glands, on one or both sides, there is not much doubt that the depression seen in the skulls of Arabs and Thoroughbreds represents the pit for the tear-gland of Antelopes and Deer (fig. 5).

Prof. W. Ridgeway regards bay as the typical colour of the Arab. This is confirmed in some degree by the fact that grey Arabs when aged tend to become flecked with chestnut; and also by the circumstance that some grey Arabs are slate-coloured or mouse-coloured when young.

A considerable number of skulls are placed on exhibition to illustrate the presence of a vestige of the facial gland-cavity in the skulls of Arabs and Thoroughbreds, and its general absence in those of other breeds, except Shires.

The skulls of Arab Horses are further characterised by the long interval between the first upper cheek-tooth and the outermost incisors, as well as by the relatively small size of the upper cheek-teeth, the length of the six cheek-teeth in the skull of "Jerboa" (N.H. 9) being only $6\frac{2}{3}$ inches, while the basal length of the skull itself is $19\frac{2}{3}$ inches, or nearly the same as that of the

Mongolian Wild Horse, in which the length of the tooth-row is $7\frac{1}{2}$ inches. The upper cheek-teeth (fig. 16, C) in the skull of an Arab presented by Mr. Wilfrid Scawen Blunt (N.H. 20) and likewise remarkable for the extensive folding, or frilling, of the enamel in the centre of the crown; while in both the Arab skulls in the collection the anterior pillar of the upper molars presents an unusually short grinding surface. Both these features are noticeable in the cheek-teeth of the extinct *Equus sivalensis* of India; the skull of that species (N. H. 42) likewise displaying a vestige of the preorbital depression in a more marked degree than in Arabs and Thoroughbreds. In all these respects the skulls of Arabs and *Equus sivalensis* approximate to that of *Hipparion* (N.H. 49).

The skulls of Arabs (fig. 18) differ markedly from those of ordinary Horses in the strongly sinuous profile of the face, in the narrow muzzle, and in the great width and depth of the hinder part or "angle" of the lower jaw, as well as in certain minor details; all these features corresponding with the contour of the head of living Arabs. Some Thoroughbreds, such as those of the "King Tom" line, exhibit the characteristic Arab profile very distinctly.

Among Mr. Blunt's Arab stud the presence of a large "wolf-tooth," or rudimentary first premolar is stated to be far from uncommon, at least in the upper jaw, whereas such large teeth are rare in ordinary Horses. Such a tooth was generally, if not invariably, present in both jaws in the extinct *Equus sivalensis* and its allies.

In addition to the features already noticed, Arabs are characterised by the following peculiarities:—

The skull is relatively short, very wide between the eye-sockets, which are high and prominent, thus giving a wide field of vision; while the lower jaw is slender in front, and very deep and wide-set behind. The chest is rounded, and the back and loins are well "ribbed up," due to the presence of only five (in place of six) lumbar or ribless vertebræ. The pelvis—in connection with great speed—is set more nearly horizontal than in other Horses; the croup, or tail-region, is relatively high; and there are only sixteen (in place of eighteen) caudal, or tail, vertebræ. In the

limbs the shaft of the ulna, or small bone of the lower part of the fore-leg, is complete; the cannon-bones are elongated and slender; and the pasterns are long and sloping. Desert-bred Arabs are stated to have denser bones than ordinary Horses.

Despite the fact that a complete ulna has been observed in a skeleton of Grévy's Zebra, the whole of the foregoing characters are regarded by Prof. H. F. Osborn (*Bulletin of the American Museum of Natural History*, vol. xxxiii, pp. 259-263, 1907) to justify the specific separation of the Arab Horse, for which he adopts Sanson's name of *Equus africanus*.* The origin and descent of the Arab are considered by the same observer to be totally different from those of the Northern Horse.

As regards the extent to which the facial part of the skull is bent down on the basal axis, there appears to be some amount of variation among Arabs and Thoroughbreds; but the feature is always developed in a considerable degree. It also occurs in the skull of the extinct *Equus sivalensis* as is shown by a cast (N.H. 42) in the north side of the table-case.

This marked bending-down of the face in *Equus sivalensis*, coupled with the presence of a distinct remnant of the preorbital face-pit in the skull and the above-mentioned characters of the dentition, indicates the essential distinction of that species from the Mongolian Wild Horse, which, as already mentioned, is regarded as the survivor of the ancestral type which gave rise to the ordinary Horses of North-western Europe. And since several of the features characteristic of Arabs and Thoroughbreds are met with in *Equus sivalensis*, there seems a probability that the latter (or some closely allied race) may have been the ancestral stock from which Barbs, Arabs, and Thoroughbreds are derived. At any rate, this theory seems to afford a better working explanation of the facts of the case (so far as they are at present known) than any other hitherto suggested. If the Arab Horse should ever be proved to be descended from a species distinct from the one which gave rise to the Wild Horse of Mongolia, it will, of course, have to bear a name other than *Equus caballus*.

* See note page 17.

Specimens of Limitations of space, apart from all other con-
Arabs and siderations, prevent the exhibition of complete
Thoroughbreds. specimens of the larger breeds of Horses; and
the exhibited series is therefore, in the main, limited to heads,
skulls, limb-bones, and miniature models, supplemented by pictures.
Arabs are, at present, represented by a statuette of "Zenghis
Khan" (N.H. 124), modelled in Hungary, and two skulls of
mares. One of the skulls (N.H. 20, fig. 18) is the gift of Mr. W.
Scawen Blunt, the well-known breeder of Arabs, while the other
"Jerboa" (N.H. 9) was presented by Mr. H. T. Sills of Cape
Colony. Both are mares and show the characteristic curved facial
contour already referred to, which reappears in some Thorough-
breds, as in the skull of "Royal Hampton" (N.H. 11), shown
alongside that of Jerboa, and also in that of "Corrie Roy"
(N.H. 10). "Royal Hampton," it may be added, was a descendant
of "King Tom" (see pedigree). A photograph of the "Darley
Arabian," taken from the original picture at Aldby Park, York, and
presented by Miss F. M. Darley, has been here reproduced
(fig. 15) as a good illustration of the Arab type; this particular
Horse having taken a considerable share in the production of the
modern Thoroughbred.

From the "Darley Arabian" was descended the famous
Thoroughbred Stallion "Eclipse," of whose skull and skeleton
photographs (N.H. 128) are exhibited on the back of the case
containing the skeletons of the Man and the Horse. The skeleton
of "Eclipse" is preserved at the Royal College of Veterinary
Surgeons in Red Lion Square, Holborn. "Eclipse" was bred by
the Duke of Cumberland in 1764 (the year of the great eclipse
of the sun), and died in 1789. He was a chestnut, with a white
blaze on the face and one white foot. He was never beaten, and
during his two years turf-career was the winner of eighteen races.
"Eclipse" was sired by "Marske," a great grandson of the
"Darley Arabian."

Of Thoroughbreds represented in the collection by skulls, or
skulls and skeletons, by far the most celebrated is the stallion
"Stockwell," who was foaled in 1849, and died in 1876. He
was winner of the St. Leger in 1852. The skull (N.H. 15) and

skeleton was presented by Mr. J. C. Naylor in 1876. The following is the pedigree of this Racehorse for four generations :—

STOCKWELL, 1849	{	The Baron, 1842	{	Birdcatcher, 1833	{	Sir Hercules, 1826
					{	Guiccioli, 1826
				Echidna, 1837	{	Economist, 1826
					{	Miss Pratt, 1825
	{	Pocahontas, 1837	{	Glencoe, 1883	{	Sultan, 1816
					{	Trampoline, 1825
				Marpessa, 1830	{	Muley, 1810
					{	Clare, 1824

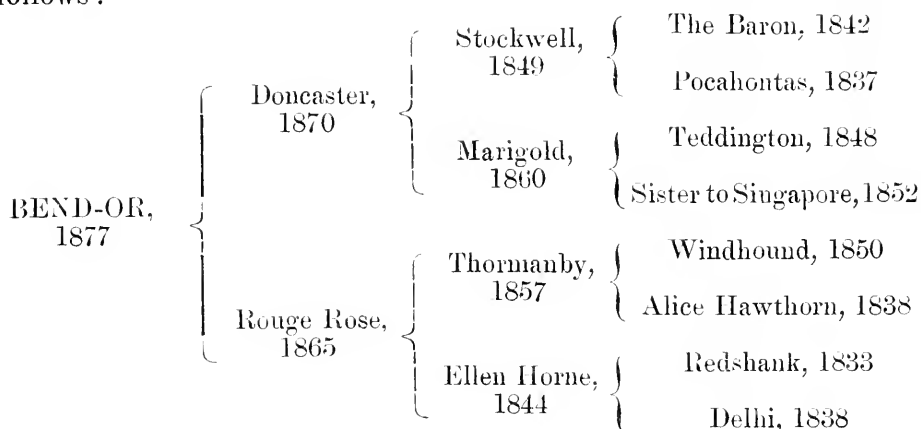
“Stockwell” had a large amount of the blood of “Eclipse” in his veins, and also a strain of that of “Herod.”

Another celebrated Thoroughbred stallion is “Ormonde,” who was foaled in 1884, and died in 1904. Bred by the First Duke of Westminster, he was winner of the Derby, the St. Leger, and the Two Thousand Guineas in 1886, and was an unbeaten Horse. Ormonde is generally regarded as the best racer of the 19th century. The skull (N.H. **13**) and part of the skeleton were presented by Mr. A. B. Macdonough in 1905. The pedigree of this stallion, to the fourth generation, is as follows :—

ORMONDE, 1884	{	Bend-Or, 1877	{	Doncaster, 1870	{	Stockwell, 1849
					{	Marigold, 1860
				Rouge Rose, 1865	{	Thormanby, 1857
					{	Ellen Horne, 1844
	{	Lily Agnes, 1871	{	Macaroni, 1860	{	Sweatmeat, 1842
					{	Jocose, 1843
				Polly Agnes, 1865	{	The Cure, 1841
					{	Miss Agnes, 1850

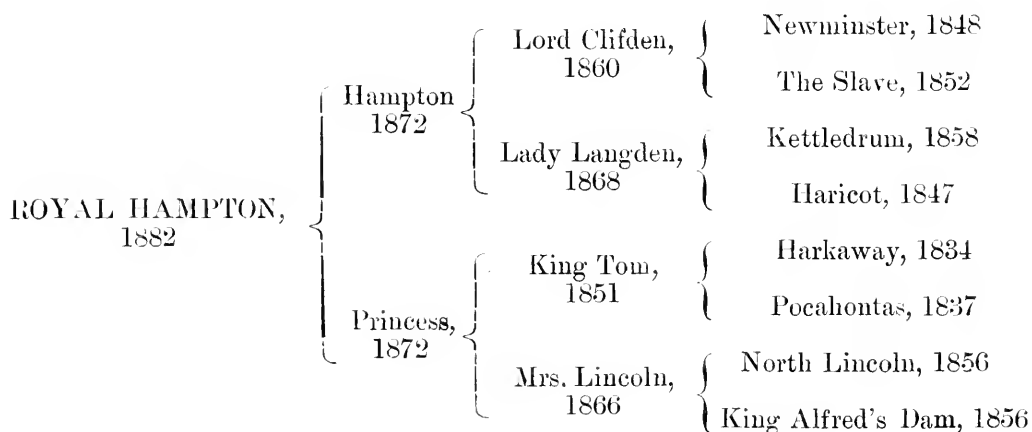
The skull of the Thoroughbred stallion, “Bend-Or” (N.H. **14**) the sire of “Ormonde,” was presented by the Duke of Westminster in 1903. “Bend-Or” was foaled in 1877 and died in 1903.

He was winner of the Derby in 1880. His pedigree is as follows :—



The Collection also contains the skull of “Royal Hampton,” a Thoroughbred stallion foaled in 1882, who died in 1906. He was winner of the National Breeder’s Produce Stakes at Sandown Park in 1884, and of the City and Suburban Handicap, 1886. “Royal Hampton” was owned by Sir J. Blundell Maple, and the skull (N.H. 11) was presented by Mrs. Ballard (Lady Maple) in 1906.

The following is the pedigree of this well-known Horse :—



The skull, in addition to showing the faint trace of a preorbital depression common to most Thoroughbreds, is noteworthy for retaining the characteristic sinuous Arab profile, which is always a character of Horses descended from “King Tom.”

Another Thoroughbred stallion of which the skull (N.H. 12) is exhibited is “Donovan,” who was foaled in 1886 and died in February, 1905. He ran 21 races in 1888 and 1889, out of

which he won 18. The skull was presented by the Duke of Portland in 1905. Donovan's pedigree is given below :—

DONOVAN, 1886	Galopin, 1872	Vedette, 1854	{	Voltigeur, 1847
			{	Daughter of, 1849
	Mowerina, 1876	Flying Dutchess, 1853	{	Flying Dutchman, 1846
			{	Merope, 1843
		Scottish Chief, 1861	{	Lord of the Isles, 1852
			{	Miss Ann, 1846
		Stockings, 1863	{	Stockwell, 1849
			{	Go-ahead, 1853

To show the characters of the Thoroughbred head, that of "Corrie Roy," a mare foaled in 1878, who died in 1901, is exhibited. She was the winner of the St. Ebor Handicap and the Manchester November Handicap, 1883. The head (N.H. 10) was presented by Sir J. Blundell Maple, her owner, in 1901. The legs of the same mare are also exhibited, as a contrast to those of a Shire Cart-Horse.

Passing on to statuettes of Thoroughbreds, the first for mention is that of the celebrated English stallion "Persimmon" (N.H. 118), owned by H.M. the King. "Persimmon" was foaled in 1893; his sire being "St. Simon," and his dam "Perdita II." He was winner of the Derby and the St. Leger in 1896, and of the Ascot Gold Cup and Eclipse Stakes in 1897. The statuette was presented by H.R.H. the Prince of Wales in 1905. Persimmon's pedigree is as follows :—

PERSIMMON, 1893	St. Simon, 1881	Galopin, 1872	{	Vidette, 1854
			{	Flying Duchess, 1853
	Perdita II, 1881	St. Angela, 1865	{	King Tom, 1851
			{	Adeline, 1851
		Hampton, 1872	{	Lord Clifden, 1860
			{	Lady Langden, 1868
		Hermione, 1875	{	Young Melbourne, 1855
			{	La Belle Hélène, 1866

Another statuette (N.H. **119**) is that of the Thoroughbred chestnut stallion "Zinfandel," a son of "Persimmon" out of "Medora." He was foaled May 6th, 1900; and was winner of the Ascot Gold Vase, the Manchester Cup, and the Brighton Cup in 1903, and of the Jockey Club Cup at the Newmarket Houghton Meeting in 1904. The statuette was presented by the owner, Lord Howard de Walden, in 1905.

Statuettes of several half-bred stallions and mares are also shown.

In a case alongside one of the pillars on the north side of the hall are exhibited the bones of the left limbs of the Thoroughbred "Stockwell" (N.H. **97, 98**) alongside those of the Shire Horse "Blaisdon Conqueror" (N.H. **99, 100**). In the following table the measurements of the limb-bones of "Stockwell" are contrasted with those of a Cart-Horse:—

		<i>Race-Horse.</i>	<i>Cart-Horse.</i>
Fore-Limb.	Humerus	13½ in.	14¾ in.
	Radius.....	15	14½
	Metacarpus.....	10½	10¼
	1st Phalange	4	3¾
Hind-Limb.	Femur.....	17	18¼
	Tibia	15	15
	Metatarsus	12½	11¾
	1st Phalange	3¾	4

From this it will be seen that while the upper segment of the limbs (humerus and femur) is shorter in the Race-Horse than in the Cart-Horse, the reverse is the case with most of the other bones. This greater proportionate length of the lower part of the leg probably gives greater speed in the Race-Horse; but a larger series of specimens is necessary before it can be definitely affirmed that these proportions are constant.

Specimens of the Shire Horse. The Shire Horse, so-called from being chiefly bred in the Midland Counties, and the most powerful animal of its kind, is the descendant of the old English Great Horse, or Black Horse, which was used as a war-horse when armour was worn, and was capable of carrying 32 stone. By Queen Elizabeth's time it was relegated to the duties of a coach-

horse, and is now employed only as a draught-horse. In colour it is generally black, often with a white star on the forehead and white fetlocks; the tail and mane are profuse, and the legs very hairy. Although originally English, the Shire Horse was in early days crossed with Neapolitan and Flanders Horses (which have Barb blood in their veins) if not with the Barb itself, and it has been suggested that the colour of the breed is largely due to Barb ancestry. Evidence of such a crossing appears to be afforded by the presence of a distinct depression in front of the eye-socket in the skull of this breed (fig. 17); such a depression being, as already mentioned, characteristic of Barbs, Arabs, and Thoroughbreds. In the limb-bones the rudimentary lateral digits are very strongly developed (see page 10).

Among specimens of this breed exhibited in the North Hall is the skull (N.H. 8, fig. 17) of "Blaisdon Conqueror." This famous horse, whose sire was "Hitchin Conqueror" and dam "Welcome," was foaled in 1894, and died in October, 1904. He stood 17 hands, 2 inches in height, and was placed in the first class and won many cups and other prizes at the Shire Horse Show at Islington in 1899, 1902, and 1904. His number was 15989 in the Shire Horse Stud-book. The skull and limb-bones were presented by the breeder and owner, Mr. P. Stubs, in 1905. The limbs of the left side are exhibited, as mentioned above, alongside those of the Thoroughbred "Stockwell."

In the same year as the last the Museum also received the skull of another Shire Stallion, "Prince William" (N.H. 22), who was foaled in 1883, and died in 1905. His Stud-book number was 3956, and his breeder Mr. W. H. Potter. The skull was presented by Lady Wantage in 1905. Both in this and the last specimen the vestige of the preorbital depression is very clearly displayed. The cannon-bones of "Prince William" (fig. 7) are exhibited in one of the table-cases, to show the great development of the splint-bones characteristic of this breed. For remarks concerning these and other specimens of the feet of Shire Horses see page 10.

The large case in the central arch on the northern side of the hall contains the mounted head (N.H. 5) and skull (N.H. 23) of the famous Shire Mare "Starlight," presented in 1906 by Mrs. Crisp, the widow of the owner, Mr. F. Crisp, of Long

Stanton, Cambridgeshire. This mare was foaled in 1882 and died in 1899, her sire being "Sir Colin" and her dam "Williamson's Mettle." She was winner of a large number of first and champion prizes at various shows, and likewise took the gold medal at the London Shire Horse Show in 1890, 1891, and 1892.

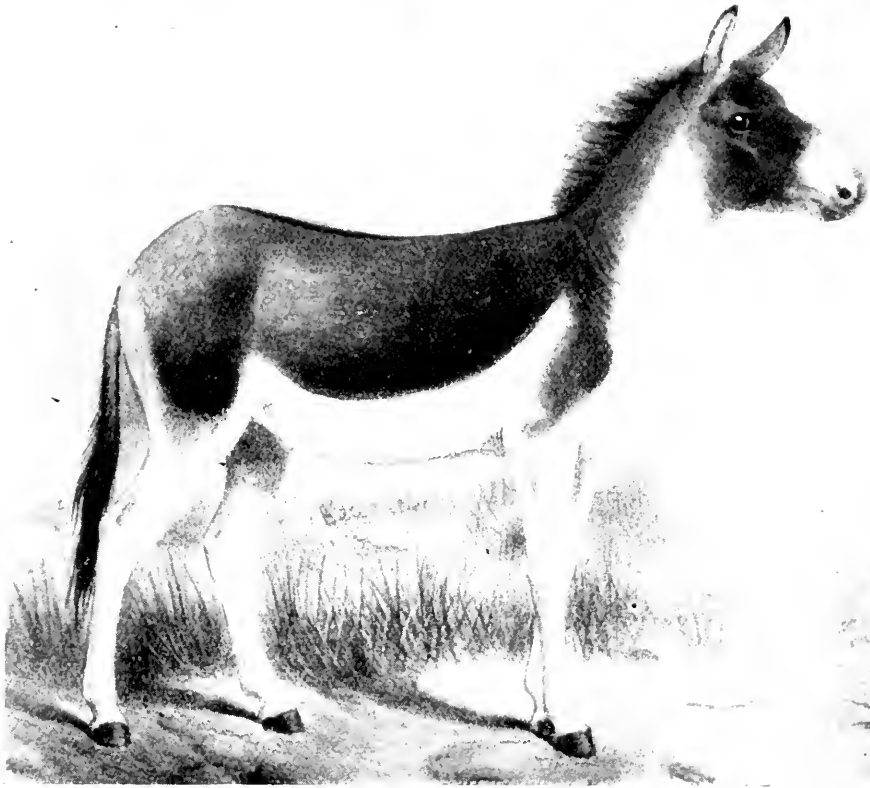
**The Khatiawar
Pony.**

Great interest attaches to a mounted specimen of a Dun Khatiawar Pony (N.H. 4) from Ahmednagar, India, exhibited in the case in the central arch on the north side of the hall, on account of the presence of a dark dorsal stripe and of zebra-like markings on the legs, as well as of a trace of a shoulder-stripe. The specimen was presented by the Superintendant of the Veterinary Department, Bombay, in 1903. Ponies of this breed are referred to by Darwin on account of dun-coloured specimens (like the one exhibited) so frequently showing dark barrings on the legs. The breed has been regarded as mainly derived from the Arab, and very probably it may have been crossed with the latter. In general colouring, and especially in the presence of a dark stripe down the back, as well as in the large size of the head and relatively low setting-on of the tail, which is sparsely haired at the root, where some of the hairs are tan-coloured, dun-coloured individuals are, however, much more like the Dun Norwegian Pony and the Wild Mongolian Horse. Arabs apparently never show a dark dorsal streak, which is essentially a character of the dun northern type. Unfortunately no specimen of the skull is at present available for a comparison of the cheek-teeth with those of the Wild Mongolian Horse.

**The Chigetai
and Kiang.**

The nearest living relative of the Horse is the Central Asian species represented by the Chigetai of the Mongols and the Kiang of the Ladakis; these being apparently local races of a single species, *Equus hemionus*. These animals are commonly termed Wild Asses, although they have no near relationship to the true Wild Asses (*Equus asinus*) of Africa. Like all the undermentioned members of the family, the species differs from the Horse by the absence of callosities on the hind-limbs, and the large size and less warty nature of the front callosities; as well as by the tail having long hairs only near the tip.

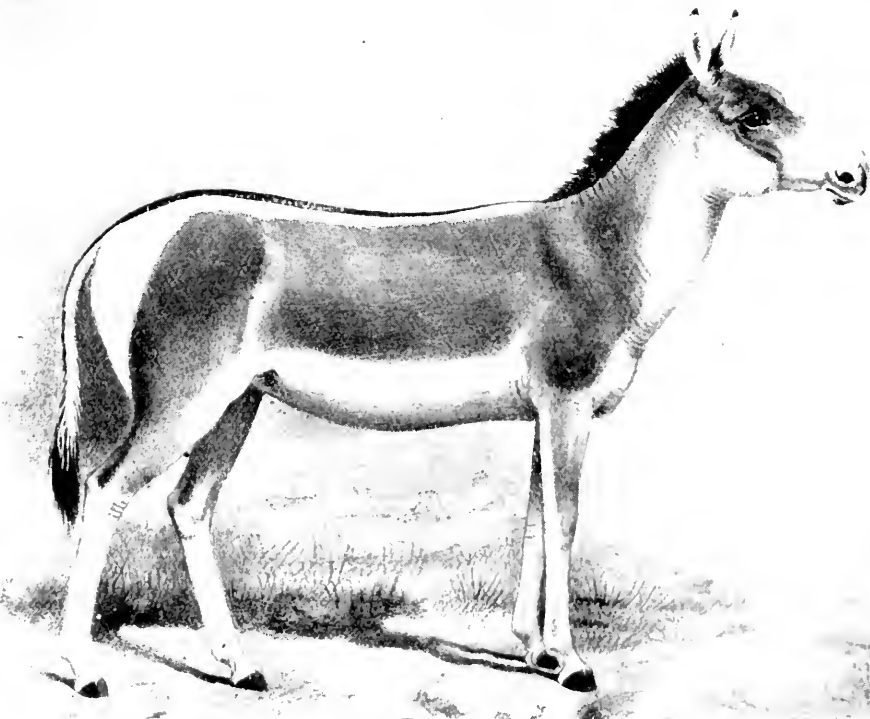
FIG. 19.



THE KIANG.

(Lydekker, *Proc. Zool. Soc.* 1904, vol. i, pl. xxviii.)

FIG. 20.



THE KOBDO ONAGER.

(Lydekker, *Novitates Zoologicae*, vol. xl, pl. xvii.)

[To face page 28.]

The Chigetai-Kiang is a native of Mongolia and Turkestan, ranging northwards to Transbaikalia and westwards to Transcaspia. In size it is large, the height at the shoulder reaching to $12\frac{3}{4}$ hands. The ears (in comparison with those of *E. asinus*) are relatively small and horselike; and the hoofs are large and broad, the width of the front pair markedly exceeding that of the hind ones. The tail-tuft is large, and a slight rudiment of a forelock is present. A relatively narrow dark dorsal stripe reaching the tail-tuft, and (in most cases at any rate) not bordered with white, is present; but there is no shoulder-stripe, or dark barrings on the limbs, although there is a dark ring immediately above the hoofs. The general colour of the upper-parts, in the summer coat, varies from bright rufous chestnut (with a more or less marked tinge of greyish fawn on the neck) to reddish sandy; but the muzzle, the inside of the ear, the throat, under-parts, the inner side of the legs, and a streak on the buttocks, are pure white or buffish white. In the long winter coat the general colour is apparently not distinctly grey, although greyish in the typical form. The cry is a "shrieking bray."

The Kiang (*Equus hemionus kiang*, fig. 19), of Ladak and Tibet, as may be seen by comparing the mounted specimen (M. 1013) in the lower mammal gallery of the Museum with the example of the Somali Wild Ass standing in the same case, is characterised by the great width of the hoofs, more especially the front pair. In this respect it approaches *Equus caballus* (as it does in its relatively small ears and its colour), and differs widely from *E. asinus*. The Ghor-khar and Onagers, on the other hand, have small and narrow hoofs, like those of the last-named species.

The Kiang is by far the reddest of all the Asiatic Wild Asses, and apparently becomes but little greyer in winter. In addition to its small ears, broad hoofs, narrow dorsal stripe, and general colour, it is affiliated to *Equus caballus* (inclusive of the Wild Horse of Mongolia, *E. c. przewalskii*) by the nature of its cry, which is to a great extent intermediate between that of the Horse and the Ass; although there is a certain amount of discrepancy between the description of the Kiang's call given by different observers. General Cunningham, for instance, in his work on "Ladak," calls it a neigh, and other observers have described it as

much like neighing as braying; but Moorcroft and General Strachey described it as more like braying than neighing, the latter traveller observing that "my impression of the voice of the Kiang is that it is a shrieking bray, not like that of the Common Ass, but still a real bray, and not a neigh." It is perfectly distinct from the bray of *E. asinus*, and also differs from the cry of one of the races of *E. onager*.

A sinuous profile, a narrow chocolate dorsal stripe, and chestnut body-colour, with pure white on the muzzle, shoulder, underparts and inner sides of the limbs are distinctive features of the Kiang.

The typical race of the species (*Equus hemionus typicus*), inhabiting Mongolia and Turkestan, is termed Chigetai by the Mongols and Kulan by the Tatars and Kirghiz. It is at present not shown in the collection. In its make and actions—especially of starting when alarmed with the head so elevated that the plane of the face is almost horizontal—as well as in the general type of colouring, the Chigetai agrees essentially with the Kiang. Both in the winter and summer coat it lacks, however, the distinctly rufous-chestnut tint characteristic of the latter, while it is also characterised by the less marked contrast between the light and dark areas of the coat; the light areas on the muzzle, buttocks, legs, underparts, etc., being "isabella-coloured" instead of white, and thus less differentiated from the fawn of the rest of the body; while the light areas on the neck and shoulder are smaller. The general colour is pale sandy fawn, with the tips of the ears, mane, dorsal stripe (which is continued down the tail) brown; and there seems little difference in this respect between the summer and the winter coat.

The Onager or Ghor-khar.

The next Asiatic representative of the family is the Onager or Ghor-khar (*Equus onager*) of the desert districts of Western and W. Central Asia and North-Western India, where it is represented by several local races. In size it is considerably less than *E. hemionus*, the minimum recorded height being 11 and the maximum $11\frac{1}{2}$ hands. The ears are apparently much the same as in the latter; and the hoofs are narrow and Ass-like; the front pair being but little wider than the hind pair. The profile of the face is either nearly straight

or markedly sinuous ; the tail-tuft is moderate, and the dark dorsal stripe is very broad, in some cases stopping short of the tail-tuft, and bordered, at least posteriorly, by a band of white or whitish, which joins the white on the buttocks and the back of the thighs. The upper-parts, in the summer coat, are usually some shade of pale reddish fawn or sandy (isabelline) ; while the light areas, which vary from pure white to whity brown, are much the same in extent as those of *E. hemionus*, but extend more on to the buttocks, and thence along the sides of the dorsal stripe, and in some cases occupy more of the body and head. In winter the long and rough coat becomes more or less decidedly grey, and in one race is distinctly mouse-grey with sharply defined white areas.

The cry of the Indian Ghor-khar is a "shrieking bray," and therefore not unlike that of the Kiang ; but in the case of the Syrian Onager, and probably also in that of the true Onager, it is stated to be more like that of the Ass, to the wild forms of which the species approximates in its narrow hoofs, broad dorsal stripe, small tail-tuft, and grey colour of the winter coat in at least one local race.

The Onager appears to be represented in a Prehistoric sketch incised on a fragment of Reindeer antler discovered in the cave of Kesslerloch, Schaffhausen.

No specimen of this species is at present exhibited.

Of the local races of this species, the first is the Indian Ghor-khar (*Equus onager indicus*) of the deserts of Sind, Kach, and Baluchistan. The height at the shoulder reaches $11\frac{1}{2}$ hands, and the profile of the face is straight. The general colour of the upper-parts is sandy in summer, with the light band on each side of the dorsal stripe narrow, ill-defined, and whitey-brown in colour, and the white on the rump not pure. The broad dorsal stripe does not reach the tail-tuft.

The second race is the Kobdo Onager (*Equus onager castaneus*, fig. 20), from Kirghis-Nor, Kobdo, in Western Mongolia, characterised by the straight profile of the face, the rufous isabella hue of the summer coat, the full mouse-grey colour of the winter coat, the large amount of pure white on the buttocks, and the distinctness of the pure white band on each side of the dorsal stripe, which extends quite down to the tail-tuft. The broad chocolate-coloured dorsal

stripe reaches to the tail-tuft, and is bordered on each side by a wide pure white band, expanding to join a large white blaze on the buttocks and the hind surface of the thighs. The other light areas are the muzzle, throat, chest, under-parts, and inner sides and lower portions of the limbs; the inside of the ears being greyish white, while elsewhere the general colour in the winter coat is grey-fawn, with a faint tinge of sandy rufous in places. In the summer coat the dark areas are bright sandy fawn or rufous isabella, with a white rump-patch, muzzle, and under-parts; the sides of the face and throat, as well as the outer side of the lower part of the legs, being pale isabella, as is also an indistinct line on the flank in front of the thigh. In no other Onager with a uniform body-colour is there such a large white rump-patch.

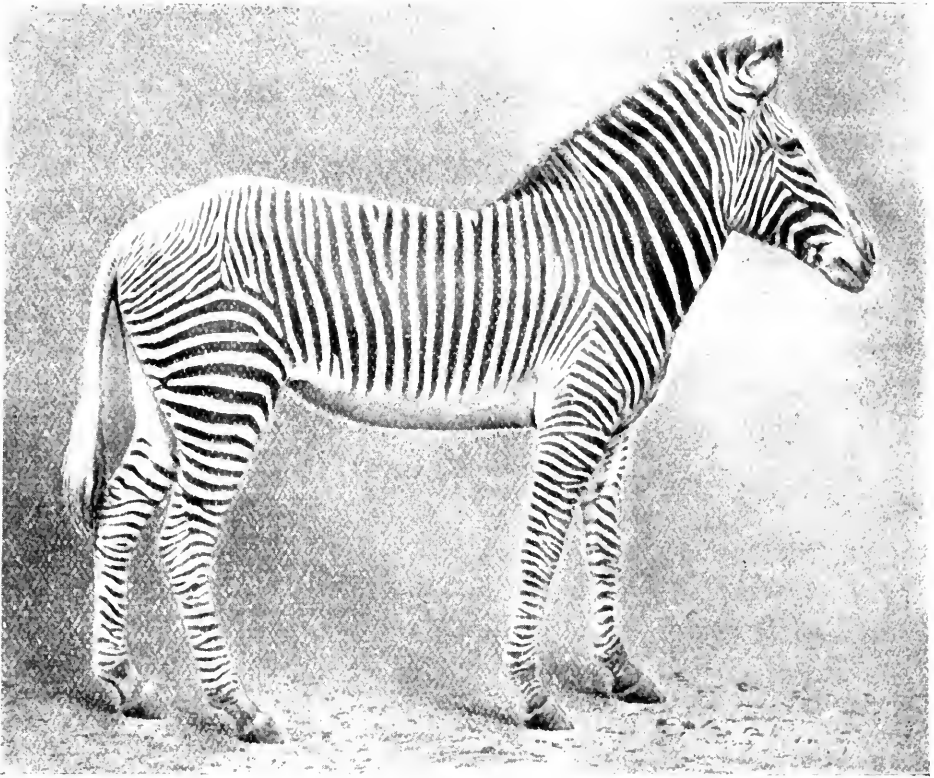
The Syrian Onager (*Equus onager hemippus*), of the deserts between Bagdad and Palmyra, Mesopotamia, and North Arabia, is reddish isabella-colour above, with the dorsal stripe not extending to the root of the tail, of which the tip is moderately haired; the throat, the under-parts, a broad band on each side of the dorsal stripe, the hind border of the thigh, and an oblique band above the flanks are silver-white. So far as is known, the profile is sinuous, and the ears and head are relatively small.

The fourth race is the Persian Onager (*Equus onager typicus*) of Northern Persia, characteristic by the predominance of the white over the fawn-coloured areas of the head and body. The general colour is silvery white; the dorsal stripe does not reach the tail-tuft; and the head, the sides of the neck, a small, ill-defined band in front of the shoulder, a larger quadrangular patch on the sides of the body, the middle of the hip, and the upper part of the limbs are isabella-colour. The profile is remarkably convex, and the ears are relatively small. This race is the lightest in colour of all the Asiatic Wild Asses, the fawn-coloured area being reduced to large isolated patches.

**Grevy's
Zebra.**

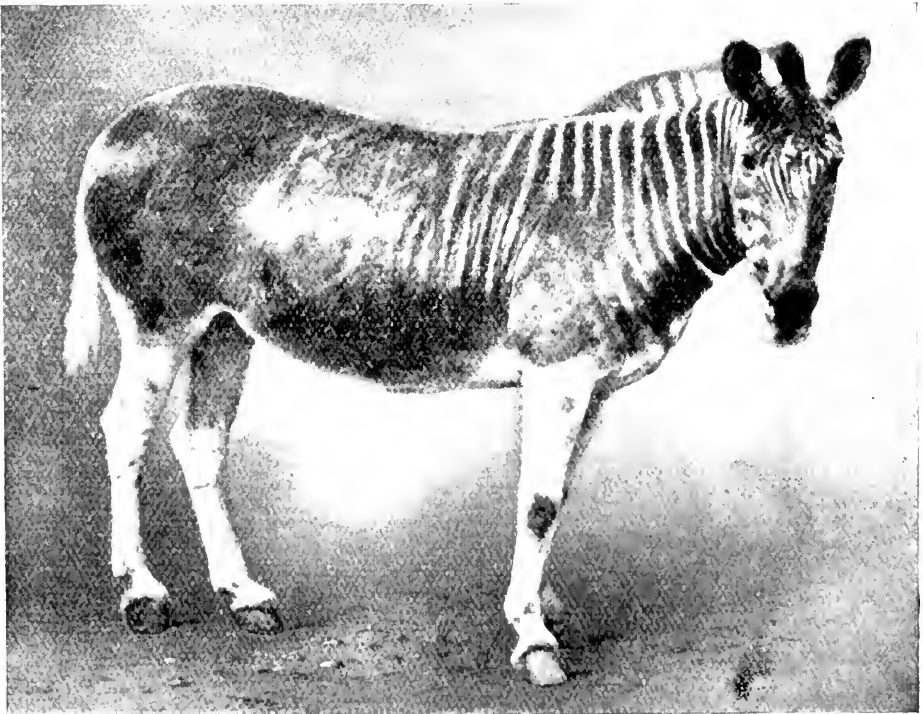
The species known as Grévy's Zebra (*Equus grevyi*, M. 1025, fig. 21), which inhabits Somaliland and Abyssinia, and is thus the most northerly of the striped group, is markedly different in many respects from the true Zebras and Quaggas. The arrangement of the striping on the hind-quarters is altogether unique; the callosities on the fore-legs are as

FIG. 21.



GRÉVY'S ZEBRA.

FIG. 22.



THE QUAGGA.

(From a photograph of a living specimen.)

[To face page 32.]

small as in the Horse ; and, as in that species, the mane extends on to the withers, and the tail-tuft is large and full. Furthermore, the large, broad, and thickly-haired ears are quite different from those of all other members of the family, which are narrow and pointed. The large size of the ears and the narrowness of the stripes appear to be adaptations to a life partially spent in thick scrub, as is shown in a photograph by Lord Delamere, exhibited in the lower mammal gallery. A fine male specimen of the species, presented by Gen. Sir A. H. Fitzroy Paget, is shown in the large Zebra case in the same gallery.

The colour-pattern of Grévy's Zebra may be described as follows :—The dark (dark brown or black) and light stripes on the body, head, and limbs are for the most part very narrow, widening out only on the lower jaw, on the neck, and on the lower part of the thigh. On the flank none of the stripes bend backwards and upwards to extend on to the hind-quarters, the upper portion of which is marked with vertical stripes arranged concentrically round the root of the tail. The dorsal stripe is very broad, especially near the middle of the back ; and there are no transverse stripes on the under-parts. The stripes on the nose practically stop short of the nostril-patches, and the nose itself is greyish.

It will be evident from this description that in the present species the stripes on the rump have their concavity directed upwards, whereas in the next species the convexity is upwards.

Two races, or subspecies, of Grévy's Zebra have been named.

The Quagga. The extinct South African Quagga (*Equus quagga*, M. 1017, fig. 22), together with the following striped species, has the callosities on the front legs larger than in Grévy's Zebra, and the stripes broader. In this group, whenever the hind-quarters are striped, the stripes are obliquely longitudinal, with the uppermost ones arising from the posterior region of the body, where their upper extremities are bent backwards towards the root of the tail in such a manner that there is no concentric arrangement round the latter. The muzzle is dark, and usually black, and the stripes on the nose are continuous with the dark patches round the nostrils. The ears are narrow.

In the Quagga, which was confined to the plains south of the Orange River, the ears are comparatively small, the front hoofs are

rather large, and full striping is developed only on the head, neck, and fore-quarters, although in some specimens spots on the flanks indicate disappearing stripes further back. The stripes do not extend across the lower surface of the body. The general colour appears to have been yellowish red, or chestnut.

The species is represented in the collection by the mounted skin and the skeleton of a male formerly living in the Zoological Gardens in Regent's Park. That animal, which was one of the last survivors of the species, was presented to the Zoological Society by Sir George Grey, K.C.B. in 1858, and lived in the Menagerie in the Regent's Park till June 1864.

The skin is exhibited in case No. **38**, in the lower mammal gallery, and the skull on the opposite side of the same case. This skull shows a vestige of a cavity in front of the eye-socket.

It is very probable that several local races of the Quagga formerly existed, and four of these have already been recognized and named. In the case of an extinct species it is, however, very difficult to arrive at any satisfactory conclusion with regard to its local forms.

The following observations in regard to the colouring of Quaggas and Zebras appeared in *Nature* for 1903.

Colouring of Quaggas and Zebras. The testimony of observers in the field has established the truth that the coloration of the coat renders a Zebra invisible under three conditions, namely, at a distance on the open plain in midday, at close quarters in the dusk and on moonlit nights, and in the cover afforded by thickets. One reason for this is the blending of the white stripes with the shafts of light sifted through the foliage and branches and reflected by the leaves of the trees, so that in an uncertain light or at long range these mutually counteract each other and fuse to a uniform grey. It is also probable that the alternate arrangement of the black and white bars contributes something to the effect produced, by imparting a blurred appearance to the body and destroying the evenness of its surface owing to the difference in light-reflecting power between hairs of these hues. Again, the extension of the stripes to the edge of the body and legs breaks up the continuity of the outline, this being apparently the reason for the alteration in their direction on the hind-quarters and limbs, so that, except

on the forehead, the whole animal is barred transversely with reference to the lines of its spine and limbs.

It is also stated that the Asses of the deserts of North-East Africa are perfectly adapted to their surroundings in colour, and no one can doubt that the assimilation is equally perfect in the case of the Kiang and the Wild Horse of Central Asia. In the matter of colouring the Kiang recalls the Quagga, despite a difference in the deepness of the brown pervading the upper-parts in the two species. Notwithstanding this difference, there seems no question that the explanation of the significance of the colouring of the Kiang applies with equal truth to the Quagga. This explanation is the action of light and shade.

In the Kiang it will be noticed that the upper-parts, on which the light falls, are of a rich ruddy hue, darker than ordinary sand, while the muzzle, the lower side of the head, the throat and under-parts are creamy white; an arrangement which must render it practically invisible when standing in the desert at a distance. The white limbs and backs of the thighs may be explained as follows:—When a Kiang lies down, with the hind-quarters depressed, the fore-legs folded and the hind-legs tucked in close to the body, the white on the back of the thighs is brought into line with that of the belly, and a continuous expanse of white, obliterating the shadow, extends all along the underside from the knee to the root of the tail. The same is the case with the Quagga and the under-mentioned Bonte-Quagga; and it indicates, in the case of the latter, the meaning of the change in pattern presented by the different local races as we pass from Somaliland southwards into Cape Colony. In correlation with the adoption of a life in the open, a new method of concealment by means of shadow counteraction was required, and was perfected by the toning down of the stripes on the upper side and the suppression of those on the hind-quarters, legs, and under-parts.

**Burchell's Zebra,
or Bonte-Quagga.**

Although the typical southern race of the exceedingly variable species known as *Equus burchelli* is commonly called Burchell's Zebra, it is much better designated by its Boer title of Bonte-Quagga (*i. e.* Painted Quagga), since this obviates the use of such incon-

venient names as "Chapman's Burchell's Zebra." The species is very closely allied to the Quagga, from which perhaps it is not really separable; but the stripes are always well developed on the hind-quarters, where they present the characters mentioned under the heading of that animal. The species displays remarkable variation in colouring and markings as we proceed from south to north; the typical southern race (fig. 23) having dark brown stripes with intervening brown "shadow-stripes" on an orange ground, and unstriped legs, whereas in the northern race (fig. 24) the stripes, which are black on a white ground, extend down to the hoofs, and have no intervening shadow-stripes.

In all cases the upper extremities of some five or six stripes on the hind half of the body are bent backwards parallel to the dorsal stripe; while the light area between these body-stripes and the dorsal stripe is continued to the root of the tail, and is not crossed by transverse bars, but traversed longitudinally by the backward extension of at least one of the body-stripes.

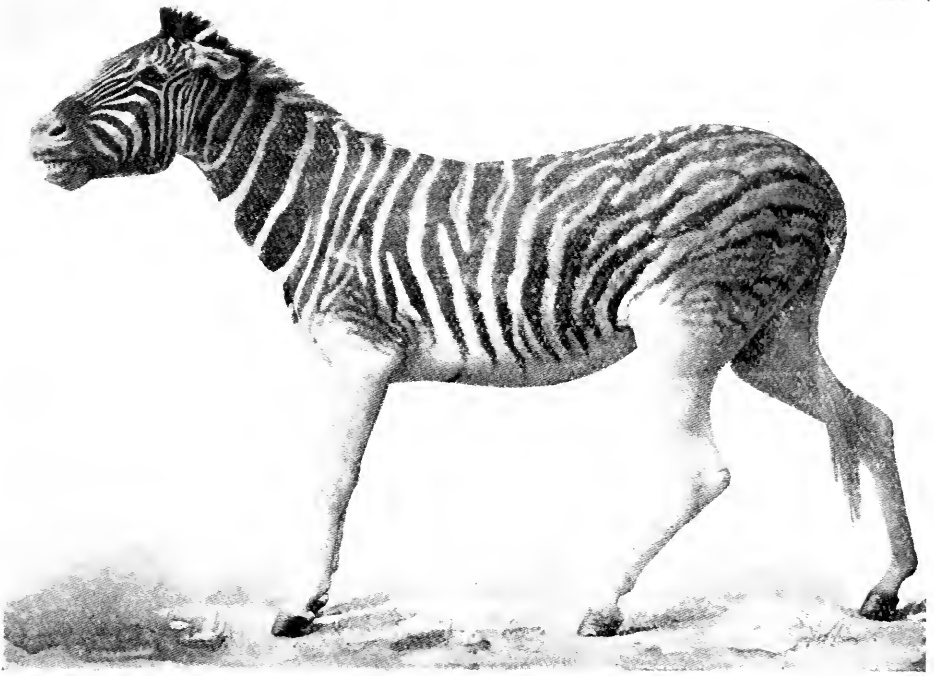
The typical Burchell's Bonte-Quagga, or Burchell's Zebra (*Equus burchelli typicus*, M. 1018, fig. 23), now nearly, if not completely, extinct as a wild animal, formerly inhabited British Bechuanaland and some of the adjacent districts in enormous droves. In this race the ground-colour is orange, and the shadow-stripes on the hind-quarters are very strongly marked, and narrower than the main stripes, which are themselves broader than the light interspaces containing the shadow-stripes. The hind-quarters have only a few short stripes below the long stripe running to the root of the tail; the body-stripes stop short on the sides of the under-parts, so as to be widely separated from the longitudinal ventral stripe; and, with the occasional exception of a few on the knees and hocks, the legs are devoid of stripes, as are usually the sides of the tail.

This race is represented by a specimen from the Orange River Colony, the gift of the Hon. Walter Rothschild.

The next race (and only some of the more important ones are here referred to) is the Damaraland Bonte-Quagga (*E. burchelli antiquorum*) in which stripes are developed above the knees and hocks, but none (or very few) below. It is unrepresented in the exhibited series.

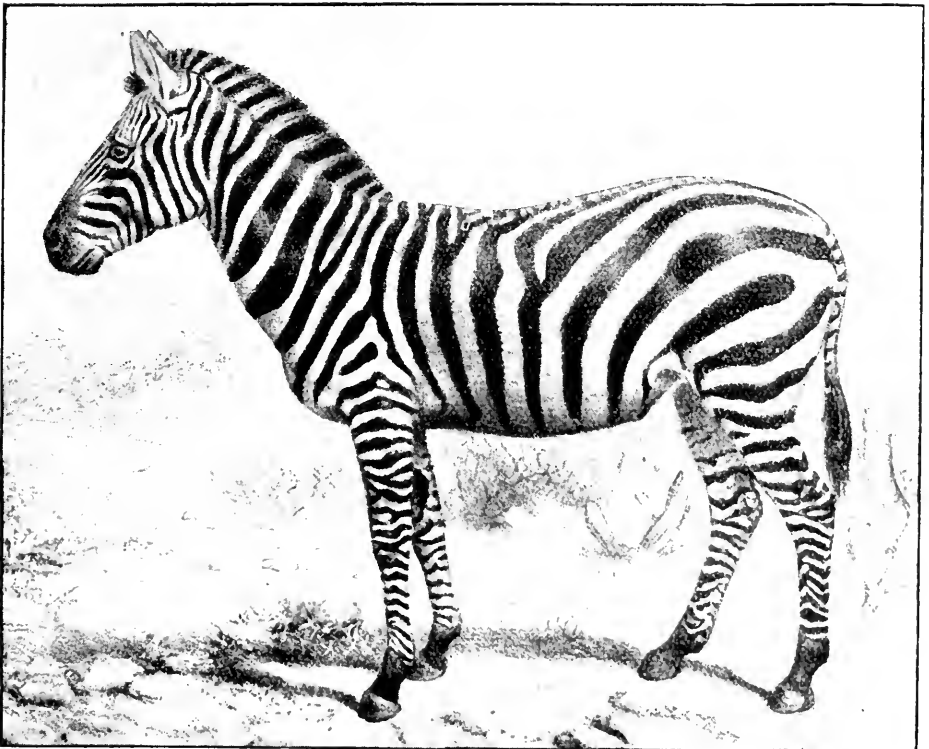
With the Zulu Bonte-Quagga (*E. burchelli wahlbergi*) we

FIG. 23.



THE BONTE-QUAGGA OR BURCHELL'S ZEBRA. Typical Race.
(Lyon, *Proc. U. S. Nat. Mus.*, vol. xxxii, pl. i.)

FIG. 24.



GRANT'S BONTE-QUAGGA.
(Selater, *Proc. Zool. Soc.*, 1901, vol. ii, pl. xxix.)

[To face page 36.]

reach a race in which, like all those which follow, the body-stripes meet the ventral stripe inferiorly, while the legs are more or less fully striped. In this particular race the shadow-stripes on the hind-quarters are strongly developed, and not much narrower than the main stripes, which are narrower than the intervening spaces; and the fetlocks and pasterns are devoid of stripes or spots. This race is represented in the collection by a specimen (M. **1022**) purchased in 1846 from Mr. Wahlberg, after whom it is named. In Chapman's Bonte-Quagga (*E. burchelli chapmani*) the shadow-stripes have become faint and narrow, the legs are marked to the hoofs, but the stripes on their lower portions tend to break up into spots, and the inferior part of the pasterns is not wholly black. This race inhabits the country between Damaraland and Matabililand; it is represented in the exhibited collection only by a photograph. The last representative of the species in which shadow-stripes are distinctly developed is the Mashona Bonte-Quagga (*E. burchelli selousi*), of which an example shot by Mr. F. C. Selous (M. **1023**) is exhibited in the large case in the Horse bay in the lower mammal gallery. It differs from the last in that the striping of the legs is complete right down to the hoofs; the pasterns being striped on both sides, and their lower part, owing to the fusion of several stripes, wholly black. The sides of the tail are also striped.

All the foregoing races inhabit the country south of the Zambesi, but they have a representative north of that river in the Kilimanjaro Bonte-Quagga (*E. burchelli boehmi*, M. **1021**), which is nearly allied to *E. b. selousi*, but retains scarcely any trace of shadow-stripes, while the stripes on the pasterns remain distinct from one another. The shadow-stripes are frequently visible only on the hind-quarters. The specimen exhibited was presented by the Hon. Walter Rothschild.

The most northern members of the species are Crawshay's Bonte-Quagga (*E. burchelli crawshayi*) of British Central Africa, or Nyasaland, represented by a head (M. **1019**) given by Lt.-Col. Manning in 1901, and Grant's Bonte-Quagga (*E. burchelli granti*) M. **1020**, fig. 24), ranging from British East Africa (Masailand) to Southern Abyssinia, of which a complete specimen from Lake Baringo is shown. In both races the shadow-stripes have

completely disappeared, and the principal stripes on the hind-quarters are not narrower (and may be broader) than the intervening spaces, which are white. In *E. burchelli crawshayi* the stripes are relatively narrow and deep black in colour, while the nostril-patches are yellowish brown, or tan, and the pasterns are coloured like those of *E. burchelli selousi*. In *E. burchelli granti*, on the other hand, the stripes are broader and apparently less completely black, while the nostril-patches are black, and the stripes on nearly the whole of the pasterns have fused into a continuous black patch.

The difference between *E. burchelli granti* and *E. burchelli typicus*, in the matter of colour and pattern, is much greater than that between the latter and *E. quagga*.

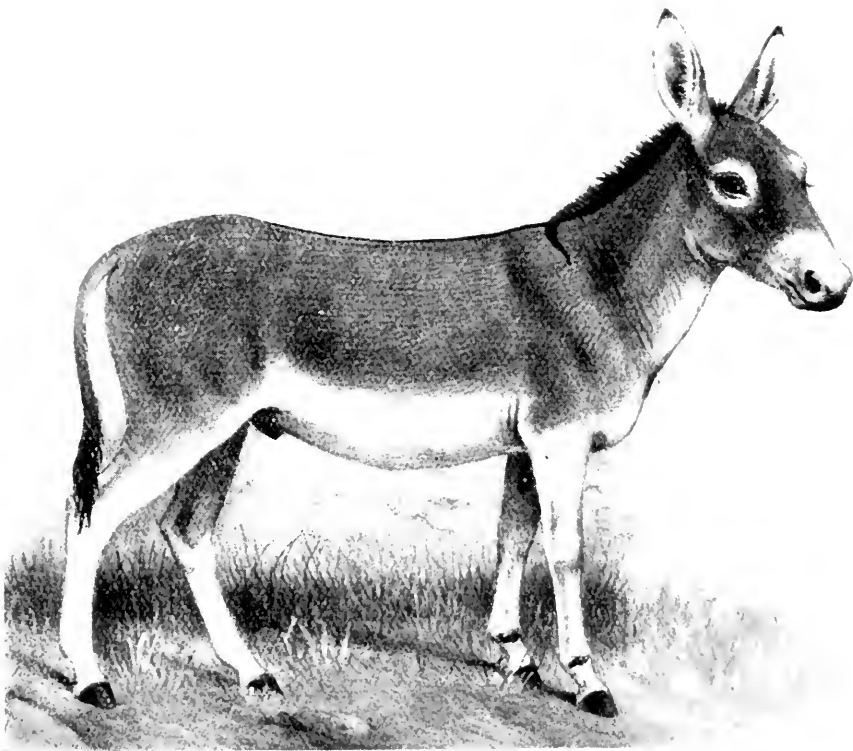
The Zebra. The true Zebra (*Equus zebra*, M. 1024, fig. 25), often termed the Mountain Zebra, in order to distinguish it from the Bonte-Quagga or Burchell's Zebra of the plains, is a very different animal to the last, and much more nearly related to the Ass. In the first place, the direction of the hairs along the spine between the withers and the rump is reversed, so that they are inclined forwards instead of backwards. Secondly, the ears are longer, the hoofs are narrower, and the tail-tuft is more scanty. Thirdly, all the body-stripes, with the exception of two passing on to the rump and hind-quarters, are continued upwards to meet the longitudinal dorsal stripe which they cut at right angles; while the area on the rump between the dorsal stripe and the uppermost haunch-stripe running to the root of the tail, in place of being longitudinally striped, is marked by a series of transverse bars forming a "gridiron-pattern." The body-stripes stop short on the sides, so as to be far removed from the ventral stripe.

The Zebra was formerly found in all the mountain-ranges of Cape Colony, but is now restricted to the Cradock district, where it is protected by law. It was from this locality that the specimen exhibited in the Lower Mammal Gallery was obtained. The species is represented in Angola by Penrice's Zebra (*E. zebra penricci*), and in Damaraland by Hartmann's Zebra (*E. z. hartmannæ*), which are, however, perhaps not separable from one another.



THE MOUNTAIN ZEBRA.

FIG. 26.



THE NUBIAN WILD ASS.

(Lydekker, *Novitates Zoologicae*, vol. xi, pl. xx.)

[To face page 38.]

Other Zebras.

In the *Proceedings* of the Zoological Society of London for 1904 (p. 181) Prof. J. C. Ewart described a Zebra, probably from the district between the upper part of the Tana River and Lake Rudolf, resembling *E. zebra* in height, the form and size of the head, ears, and muzzle, in the characters of the mane, tail, and hoofs, and also in the gridiron-pattern of the rump-stripes. It differs from that species in the backward inclination of the hairs of the broad dorsal stripe, and in certain details of striping and colour; the ground-colour being rich cream. The name of Ward's Zebra was suggested for this animal.

In the same Journal for 1906 (p. 691) the Hon. Walter Rothschild described, as *Equus annectans*, a Zebra from N. E. Rhodesia distinguished by its narrow white stripes and broad black stripes extending from behind the ears to the root of the tail. The longitudinal stripes, which extend from the root of the tail more towards the shoulder than in any other Zebra, are united to the transverse stripes, instead of being broken, as in most races of the Bonte-Quagga. In the absence of chestnut on the face it resembles *E. burchelli selousi*. The head, limbs, and tail are evenly marked with narrow white stripes on a black ground; and the ears are also strongly striped. The skull is stated to be intermediate between that of the Zebra and that of the Bonte-Quagga. Another Zebra, from German East Africa, has been named by Dr. P. Matschie (*Weidwerk in Wort und Bild*, 1906, p. 236) as *Hippotigris muansæ*.

The Ass.

The last of the living representatives of the Horse family is the Ass (*Equus asinus*), which in a domesticated condition, is found almost throughout the habitable world, and as a wild animal in North-eastern Africa, south of the Tropic, from Upper Nubia to Somaliland. It is the only Wild Ass found within the tropics, and the only one which is completely grey at all seasons of the year. The typical form of the species appears to be the Domesticated Ass of North-western Europe.

The bodily size in the wild state is medium or large, the height at the shoulder ranging from 3 ft. 9½ in. to 4 ft. 1 in. The ears are very long, the hoofs small and narrow, with no marked

superiority in the size of the front pair; while the tail-tuft is moderate, and there is no trace of a fore-lock. The dark dorsal stripe is narrow, and in some cases discontinuous, not reaching the tail-tuft, and being without white borders. Either a shoulder-stripe or dark barrings on the legs, or both together (in the domesticated race), are present, and there is no dark ring above the hoofs. There is a distinct white ring round the eye, but no white on the buttocks or rump. The general colour of the upper-parts is at all seasons pure or tawny grey-fawn; the muzzle, a ring round each eye, the under surface of the lower jaw, the inside of the ear, the under-parts, and the inner surface and much of the lower portion of the legs, being pure white. Apparently there is no marked (if any) difference, either in colour or length, between the summer and the winter coat. The cry is a bray.

There are two wild races of the species, namely the Nubian Wild Ass (*Equus asinus africanus*, M. 1014, fig. 26) inhabiting North-eastern Africa, that is to say Senaar and Nubia; its range formerly extending as far as the fifth cataract of the Nile, and eastwards to the River Atbara and the Danakil district, but not including Abyssinia. It is half-wild in Socotra. Year by year the range of this race appears to become more and more restricted; and unless measures be taken for its protection, there is danger that it may be exterminated. The race is characterised by its generally inferior size (ranging from about 3 ft. 9½ in. to 3 ft. 11½ in.) as compared with the Somali race, the generally greyish fawn-colour, the continuous, although very narrow dorsal stripe, the presence of a short shoulder-stripe, and of a dark patch on each side of the front fetlock, and the absence of distinct dark barrings on the legs.

It is represented in the lower mammal gallery by a male specimen (M. 1014) from Nakheila, on the Atbara River, presented by the Hon. Charles N. Rothschild in 1904, and also by the head of a female from Yalalub, Eastern Sudan, given by Mr. H. W. Haig.

A small breed of Nubian Wild Asses inhabits the island of Socotra. These Asses, which appear to have been originally imported from the mainland, stand only about 3½ feet at the shoulder. They are characterised by perfect similarity in colour

and markings, the nose, a wide ring round the eye, as well as the chest and belly, being white, and the legs nearly so, thus contrasting strongly with the mouse-coloured head and back. The black stripes on the shoulder and down the middle of the back, and a few somewhat irregular dusky rings round the legs, are also clearly defined.

The second, or Somali, race (*Equus asinus somaliensis* M. 1015), ranges from Somaliland, through Danakil and Gallaland, to the Red Sea. It is distinguished from the Nubian race by its superior size, the pale and more greyish colour, the absence of a shoulder-stripe, the slightly developed and discontinuous dorsal stripe, and the presence of a number of distinct black bars on the legs, and of a brownish patch on the front of each foot above the hoof. The head and ears are also relatively shorter, with less black on the front of the tips, the mane is longer and inclined to be pendent; and the white round the eye and on the muzzle is less pure and less sharply defined from the fawn, while there is no white on the under side of the lower jaw and the angle of the throat.

It is represented in the exhibited collection by a mounted male specimen (M. 10) presented by Gen. Sir A. H. Fitzroy Paget in 1893.

The Domesticated Ass is undoubtedly the direct descendant of one or both of the wild races; and, unlike the Horse, exhibits very little variation from the ancestral type; such modifications as do exist being restricted to colour and size. The colour variations consist of a tendency to albinism on the one hand, and melanism on the other; the extremes being represented respectively by white and by black Asses. As regards size, the extreme modification is represented by the Dwarf Ass of India and Ceylon, which does not stand more than about two feet at the shoulder.

In Egypt the Ass was known in a domesticated state long previous to the Horse; and a skull from an Egyptian tomb (N. H. 24), presented in 1900 by Professor Flinders-Petrie, is exhibited in the large Horse case in the north hall. The only other specimens illustrating this species are two skulls (N.H. 26, 27) male and female, from Aden, presented by the Royal Society in 1899.

Hybrids. It is probable that all the existing members of the Horse family will interbreed, although their offspring is almost invariably infertile. The most common hybrid is the Mule, the product of the male Ass with the female Horse; the opposite hybrid being the Hinny, a much rarer cross. No specimen of either of these hybrids is shown; the only hybrid Equine exhibited being a cross between a male Zebra (*Equus zebra*) and a female Ghor-khar, or Onager (*E. onager*). In this hybrid (N. H. 125), which was foaled in the Zoological Society's Menagerie in the Regent's Park the general characters are those of the Ass, as is exemplified by the large ears, the strongly marked shoulder-stripe, and the nearly uniform body-colour. In the distinctly striped legs, as well as in the darker flecking of the body (representing disappearing stripes) Zebra-characters are, however, displayed; the striping of the Zebras and Quaggas, which appears to have been inherited from the ancestors of the family, being a "prepotent" feature always strongly pronounced in hybrids of this nature.

Two other hybrids are represented by pictures. The first is Prof. Ewarts' "Romulus," the offspring of a male Bonte-Quagga or Burchell's Zebra (*Equus burchelli*) and a West Highland Pony mare, of which two photographs are shown. The second, represented by a painting executed and presented by Miss Nellie Hadden in 1904, is a hybrid brought to this country by Lord Kitchener and presented to H.M. the King, by whom it was deposited in the Menagerie of the Zoological Society. Its sire was a Pony, and its dam a Bonte-Quagga (Burchell's Zebra). It is noteworthy that although both these hybrids are very fully striped, the general body-colour (bay) of the Horse is retained.

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